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## 1.0 PROJECT OBJECTIVES

The project objective is to design and construct facilities for the military that are consistent with the design and construction practices used for civilian sector projects that perform similar functions to the military projects. For example, a Company Operations Facility has the similar function as an office/warehouse in the civilian sector; therefore the design and construction practices for a company operations facility should be consistent with the design and construction of an office/warehouse building.

### Comparison of Military Facilities to Civilian Facilities

Military Facility	Civilian Facility
Ft Lee AIT 5 Story BCOF Phase I A-Ave (Army)	Dormitory/Office Building

It is the Army's objective that these buildings will have a 25-year useful design life before a possible re-use/re-purpose or renovation requirement, to include normal sustainment, restoration, modernization activities and a 50-year building replacement life. Therefore, the design and construction should provide an appropriate level of quality to ensure the continued use of the facility over that time period with the application of reasonable preventive maintenance and repairs that would be industry-acceptable to a major civilian sector project OWNER. The site infrastructure will have at least a 50-year life expectancy with industry-accepted maintenance and repair cycles.

The project site should be developed for efficiency and to convey a sense of unity or connectivity with the adjacent buildings and with the Installation as a whole.

Requirements stated in this contract are minimums. Innovative, creative, and life cycle cost effective solutions, which meet or exceed these requirements are encouraged. Further, the OFFEROR is encouraged to seek solutions that will expedite construction (panelization, pre-engineered, etc.) and shorten the schedule. **The intent of the Government is to emphasize the placement of funds into functional/operational requirements. Materials and methods should reflect this by choosing the lowest Type of Construction allowed by code for this occupancy/project allowing the funding to be reflected in the quality of interior/exterior finishes and systems selected.**

### 1.1. SECTION ORGANIZATION

This Section is organized under 6 major "paragraphs".

- (1) Paragraph 1 is intended to define the project objectives and to provide a comparison between the military facility(ies) and comparable "civilian" type buildings.
- (2) Paragraph 2 describes the scope of the project.
- (3) Paragraph 3 provides the functional, operational and facility specific design criteria for the specific facility type(s) included in this contract or task order.
- (4) Paragraph 4 lists applicable industry and government design criteria, generally applicable to all facility types, unless otherwise indicated in the Section. It is not intended to be all-inclusive. Other industry and government standards may also be used, where necessary to produce professional designs, unless they conflict with those listed.
- (5) Paragraph 5 contains Army Standard Design Criteria, generally applicable to all facility types, unless otherwise indicated in the Section.
- (6) Paragraph 6 contains installation and project specific criteria supplementing the other 5 paragraphs.

## 1.0 PROJECT OBJECTIVES

The project objective is to design and construct facilities for the military that are consistent with the design and construction practices used for civilian sector projects that perform similar functions to the military projects. For example, a Company Operations Facility has the similar function as an Office/Dormitory Building in the civilian sector; therefore the design and construction practices should be consistent with the design and construction of a Office/Dormitory Building.

### Comparison of Military Facilities to Civilian Facilities

Military Facility	Civilian Facility
Barracks/Company Operations (BCOF)	Dormitory/Office Building
Lawn Equipment Storage Building (LEB)	Storage Building

It is the Army's objective that these buildings will have a 25-year useful life before needing any major renovation, repair, or replacement. Therefore, the design and construction should provide an appropriate level of quality to ensure the continued use of the facility over that time period with the application of reasonable preventive maintenance and repairs that would be industry-acceptable to a major civilian sector project OWNER. The site infrastructure will have at least a 50-year life expectancy with industry-accepted maintenance and repair cycles.

The Government is required by Public Law 102-486, Executive Order 12902, and Federal Regulations 10 CFR 435 to design and construct facilities in an energy-conserving manner while considering life cycle cost over the life of the facilities.

The project site(s) should be developed for efficiency and to convey a sense of unity or connectivity with the adjacent buildings and with the Installation as a whole.

Requirements stated in this RFP are minimums. Innovative, creative, and life cycle cost effective solutions, which meet or exceed these requirements are encouraged. Further, the OFFEROR is encouraged to seek solutions that will expedite construction (panelization, pre-engineered, etc.) and shorten the schedule. The intent of the Government is to emphasize the placement of funds into functional/operational requirements. Materials and methods should reflect this by choosing the lowest Type of Construction allowed by code for this occupancy/project allowing the funding to be reflected in the quality of interior/exterior finishes and systems selected.

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## **2.0 SCOPE**

Construct an Advanced Individual Training (AIT) Complex to include facilities listed below and physical training areas.

### **2.1 BARRACKS/COMPANY OPERATIONS FACILITY (BCOF)**

Provide one Barracks/Company Operations Facility. This facility type is to house trainee single soldiers and company administrative, training and command operations. It is intended to be similar both functionally and technically to a dormitory in the community surrounding the Installation.

Maximum number of single personnel to be housed for this phase, Phase I, is 300 soldiers (450 soldier surge) in one wing located adjacent to the B/COF core area. The core area shall be designed for total anticipated personnel of 600 soldiers (900 soldier surge). The Phase I B/COF shall be five stories high and shall house 60 soldiers per floor. The design of the facility shall take into consideration the addition of FY12 Phase II, Not In Contract (NIC) which would require a second wing to be designed and constructed adjacent to the core area to house the remaining 300 soldiers (450 soldier surge). The design for Phase I shall be comprehensive to stand alone in the event that Phase II does not get constructed.

The gross area per barracks for Phase I is approximately 121,042 sf, which includes approximately 3,500 sf of covered exterior area.

The B/COF floor plans provided in Appendix J-Drawings indicate functional and operational arrangements that meet user operability requirements. These drawings are mandatory. The Design/Build (D/B) Contractor is required to adhere to these mandatory designs. Minor plan alterations are permitted to accommodate building system requirements and applicable codes, however the Minimum Area Requirements shall not be reduced.

### **2.2 BATTALION HEADQUARTERS (BN HQ)**

Not Used

### **2.3 BRIGADE HEADQUARTERS (BDE HQ)**

Not Used

### **2.4 DINING FACILITY (DFAC)**

Not Used

### **2.5 LAWN EQUIPMENT STORAGE BUILDING (LEB)**

Provide Lawn Maintenance Storage facilities. This project type is to provide storage for lawn maintenance equipment.

The project will include lawn maintenance storage facilities for four companies.

The maximum gross area for all Lawn Maintenance Storage facilities in the project is 1,000 sf.

### **2.6 CENTRAL ENERGY PLANT (CEP)**

Not Used

## 2.7 SITE

Provide all site improvements and exterior training areas necessary to support the new facilities. Antiterrorism/Force Protection measures shall also be included in the facility design in accordance with applicable criteria. The Contractor shall be responsible for all repairs to existing sidewalks, pavements, curb and gutter, utilities, and/or landscaping damaged as a result of the construction activities.

The minimum mandatory exterior training areas include:

- one physical training pit per company
- one 4-station pull-up bar set per company

The minimum net area per PT pit is 18,500 sf.

Approximate area available for construction is six (6) acres and is shown on the site layout plan. Refer to the Appendix J-Drawings.

## 2.8 GOVERNMENT-FURNISHED GOVERNMENT-INSTALLED EQUIPMENT (GFGI)

Coordinate with Government on GFGI item requirements and provide suitable structural support, brackets for projectors/VCRs/TVs, all utility connections and space with required clearances for all GFGI items. Include tables/cabinets/carts/etc. for GFGI equipment that is not freestanding in furniture design. All computers and related hardware, copiers, faxes, printers, video projectors, VCRs and TVs are GFGI. In addition to all items indicated as GFGI throughout this Statement of Work, the following are also GFGI items: All clothes washers and clothes dryers vending machines, all exercise equipment and dumpsters.

## 2.9 FURNITURE REQUIREMENTS

Provide furniture layout design for all spaces based on the furniture requirements listed. See paragraph: 3.4.5.8 B/COF Furniture Chart

## 2.2. SITE:

Provide all site improvements necessary to support the new building facilities. Refer to Paragraph 6.

Approximate area available 6.00 acres

## 2.3. GOVERNMENT-FURNISHED GOVERNMENT-INSTALLED EQUIPMENT (GFGI)

Coordinate with Government on GFGI item requirements and provide suitable structural support, brackets for projectors/VCRs/TVs, all utility connections and space with required clearances for all GFGI items. Fire extinguishers are GF/GI personal property, while fire extinguisher brackets and cabinets are Contractor furnished and installed CF/CI. All Computers and related hardware, copiers, faxes, printers, video projectors, VCRs and TVs are GFGI.

The following are also GFGI items: All clothes washers and clothes dryers vending machines, all exercise equipment and dumpsters.

## 2.4. FURNITURE REQUIREMENTS

Provide furniture design for all spaces listed in Chapter 3 and including any existing furniture and equipment to be re-used. Coordinate with the user to define requirements for furniture systems, movable furniture, storage systems, equipment, any existing items to be reused, etc. Early coordination of furniture design is required for a complete and usable facility.

The procurement and installation of furniture is NOT included in this contract. Furniture will be provided and installed under a separate furniture vendor/installer contract. The general contractor shall accommodate that effort with allowance for entry of the furniture vendor/installer onto this project site at the appropriate time to permit completion of the furniture installation for a complete and usable facility to coincide with the Beneficial Occupancy Date (BOD) of this project. The furniture vendor/installer contract will include all electrical pre-wiring and the whips for final connection to the building electrical systems however; the general contractor shall make the final connections to the building electrical systems under this contract. Furthermore, the general contractor shall provide all Information/Technology (IT) wiring (i.e. LAN, phone, etc.) up to and including the face plate of all freestanding and/or systems furniture desk tops as applicable, the services to install the cable and face plates in the furniture, the coordination with the furniture vendor/installer to accomplish the installation at the appropriate time, and all the final IT connections to the building systems under this contract.

The Government reserves the right to change the method for procurement of and installation of furniture to Contractor Furnished/Contractor Installed (CF/CI). CF/CI furniture will require competitive open market procurement by the Contractor using the Furniture, Fixtures and Equipment (FF&E) package.

## 2.5. NOT USED

### **3.0 ADVANCED INDIVIDUAL TRAINING COMPLEX (AIT) (REV 1.6 – 30 Sep 2009)**

#### **3.1. GENERAL**

Advanced Individual Training (AIT) complexes are required by the Army to encompass living, dining, training, and administrative/command operations. This AIT complex will be comprised of: Barracks/Company Operations Facilities (B/COF) and a Lawn Equipment Building (LEB). These facilities, with outdoor training areas and any additional support facilities shall be arranged on the site as a unit to allow the battalion to live, eat, train, and work together.

The B/COF is comprised of sleeping units, toilets, computer learning centers, multipurpose space, storage, laundry areas, day rooms, public restrooms, and Company Operations components.

The LEB is a storage building for lawn maintenance equipment.

#### **3.2. FUNCTIONAL AND AREA REQUIREMENTS**

Gross building area shall be calculated in accordance with Appendix Q. Net area is measured to the inside face of the room or space walls. Minimum dimension where stated shall be measured to the inside face of the defining enclosure. Net area requirements for programmed spaces are included in this paragraph. If net area requirements are not specified, the space shall be sized to accommodate the required function and to comply with code requirements, overall gross area limitations, and any other requirement of this RFP. Area requirements for corridors, stairs, and mechanical rooms will typically be left to the discretion of the offeror.

##### **3.2.1. ACCESSIBILITY REQUIREMENTS**

The B/COF and LEB facilities are intended for occupancy and/or use by able-bodied military personnel only. In accordance with paragraph 3 (a) of the Deputy Secretary of Defense Memorandum dated 31 October 2008: DoD Access for People with Disabilities, facilities for able-bodied personnel are exempt from accessibility requirements. Headquarters buildings shall comply with the Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities as currently amended. In accordance with ABA Section F203.6, the CCP is exempt from accessibility requirements.

Elevator shall be provided in accordance with applicable codes.

##### **3.2.2. B/COF**

###### **3.2.2.1. B/COF Functional Space Requirements**

###### **3.2.2.1.1. Sleeping Units**

**Bedroom:** Each sleeping unit shall have one, two person bedroom. Bedrooms must be of equal size and able to accommodate scheduled GFGL furniture with adequate circulation. Provide one full length wall mirror (16D to 24W inches by 72H inches). Mount full length wall mirror at the end of plumbing chase in each sleeping unit. Rooms shall be able to accommodate an extra person during periodic events resulting in a capacity surge.

**Bathroom:** Each sleeping unit shall have one bathroom with water closet and shower. Extend ceramic tile shower surround to ceiling. Provide tamper resistant showerhead with an elevation of 6'-6".

**Entry:** Each sleeping unit entry area shall have three lockable built-in closets and a lavatory with a solid surface vanity countertop. Each built-in closet shall have door handles and shall be sized to interior dimensions of 36 inches wide by 25 inches deep, with rod and shelf. Provide in each closet two 36 inch wide by 18 inch deep shelves set at 18 inches and 30 inches vertically above closet floor and capable of supporting a minimum of 15 pounds per linear foot. Each vanity shall have storage cabinets below, recessed mirrored medicine cabinet and a towel bar. Locate vanity immediately outside of bathroom.

**Utility Closet:** Provide one utility closet per sleeping unit to house the HVAC fan cooling/heating unit. Utility closet shall be accessed from the corridor only.

###### **3.2.2.1.2. Common Areas**

- a. Lobby: Provide an entry lobby.
- b. Vestibule: Provide an enclosed transition space between the exterior and interior of the building. The vestibule shall be a minimum of 7 feet between doors.
- c. Stair: Provide 4 feet 6 inch minimum width stairs.
- d. Corridors: Provide 6 feet minimum width corridors.
- e. Charge of Quarters (CQ) Station: Provide a built-in CQ Station located in the central portion of the lobby with a minimum area of 100 net square feet. Built-in station shall provide modesty screening for occupant. Station provides visual control of building circulation. The CQ Station shall provide space for two people. The CQ Station shall have a minimum of six lockable file drawers. Securable compartments for the computer monitor, keyboard, and CPU shall be built-in the reception station.
- f. Drill Instructor (DI) Office: Provide two private administrative offices with a toilet/shower located in the central core area on each floor. Each DI office shall be designed to accommodate two work stations. Provide a dressing area with a built-in 18 inch wooden bench adjacent to the shower area. Square footage for toilet/shower is included in the overall DI office space allocation.
- g. Computer Learning Center: Provide two Computer Learning Centers located in the central core area on each floor designed for computer usage with a lockable storage room. Storage room shall have a net area of 68 square feet and shall have a minimum of six, 18 inch deep storage shelves, spaced at 12 inches on center vertically and capable of supporting a minimum of 20 pounds per linear foot. Total linear footage of storage shelves shall be three times the perimeter of the storage room. Square footage for storage room is included in the overall computer learning center space allocation.
- h. Day Room: Provide two Day Rooms on each floor located in the central core area. The Day Room functions as a soldier's lounge. It includes a lockable storage room. Storage room shall have a net area of 68 square feet and shall have a minimum of six, 18 inch deep storage shelves, spaced at 12 inches on center vertically and capable of supporting a minimum of 20 pounds per linear foot. Total linear footage of storage shelves shall be three times the perimeter of the storage room. Square footage for storage room is included in the overall day room space allocation. Locate a vending area in day room. Size each vending area to accommodate two full size vending machines. Provide power receptacles for vending machines.
- i. Laundry: Provide two Laundry Rooms on each floor, located in the central core area. Laundry room door shall be 36 inches wide minimum. Furnish self-serve laundry facilities at ratios of 8 persons per washer and 6 persons per dryer at a surge population of 900 persons. This equals a minimum total of 113 heavy-duty, extra capacity washers and 150 heavy-duty, extra capacity dryers in the facility. GFGI dryers are electric and are stackable type. Contractor furnished and installed fixed heavy gauge stainless steel clothes folding/hanging tables and stainless steel utility sinks are required features of centralized laundry facilities. In each laundry room provide clothes folding/hanging tables, each measuring 2 feet deep by 5 feet wide. Designers are encouraged to design laundry rooms that are identical from floor to floor. However where this is not feasible, no floor shall provide less than 14 washers and 20 dryers (approx. 25%), with the remainder of the total required units to be provided on the remaining floors. Laundry room design shall include space and power receptacles for a GFGI laundry supplies vending machine in each laundry room. Provide power receptacles, water and drain connections for all washers. Provide power receptacles and vent connections for all dryers. Dryers shall be exhausted to the exterior.
- j. Luggage Storage: Provide two lockable luggage storage areas located in the central core area per floor with a minimum of six 24 inch deep shelves, spaced at 24 inches on center vertically and capable of supporting a minimum of 30 pounds per linear foot. Total linear footage of storage shelves shall be three times the perimeter of the storage room.
- k. Janitor: Provide four Janitor's Closets on the first floor, and two Janitor's Closets per floor for the remaining floors. Each janitor's closet shall have a 10 inch deep floor mounted stainless steel mop sink, with hot and cold service faucet, a four holder mop rack and two 18 inch deep by 48 inch long heavy duty stainless steel shelves for storage of cleaning supplies. Each janitor's closet shall have space for storage of buckets and vacuum.
- l. Mechanical, Electrical, and Telecommunications Rooms: Mechanical rooms shall accommodate space for equipment maintenance/repair access without having to remove other equipment. Mechanical, electrical and telecommunications rooms shall be keyed separately for access by Installation maintenance personnel. Filter changes and preventative maintenance shall be performed without requiring access to the bedrooms. First

floor exterior access is required for centralized mechanical room. All telecommunications rooms shall be conditioned space. Telecommunications room will be provided on each floor in accordance with the latest Installation Information Infrastructure Architecture (I3A) guidance. Telecommunications room provides a demarcation point between the outside plant cable and the building telecommunications cabling. Refer to paragraphs 3.6 MECHANICAL REQUIREMENTS and 3.7 ELECTRICAL AND TELECOMMUNICATIONS REQUIREMENTS for additional information.

- m. Boot Wash: Provide four outdoor areas for soldiers to rinse mud from field gear, boots and clothing. One Boot Wash stations shall be provided at each of the two main entrance doors, One Boot Wash station shall be provided near each of the two Scrub Rooms. Each boot wash station shall consist of two freeze-proof hydrants located adjacent to a grated drain assembly complete with sand interceptor. Provide two spray nozzles on flexible hose per hydrant.

#### 3.2.2.1.3. Company Operations Area

- a. Company Commander (CO): Provide two private administrative offices.
- b. Executive Officer (XO): Provide two private administrative offices.
- c. Waiting Area: Provide two common spaces and open office spaces for unit administrative functions, as well as centralized area for printers, fax machines and receptacles for waste and paper recycling at each Waiting Area.
- d. Operations Sergeant (OPS SGT): Provide two private administrative offices.
- e. 1<sup>ST</sup> Sergeant (1ST SGT): Provide two private administrative offices.
- f. Men's Toilet/Shower: Provide one shower stall and toilet facilities to serve the public and administrative personnel assigned to company. Provide a dressing area with a built-in 18 inch wooden bench adjacent to the shower stall.
- g. Women's Toilet/Shower: Provide one shower stall and toilet facilities to serve the public and administrative personnel assigned to company. Provide a dressing area with a built-in 18 inch wooden bench adjacent to the shower stall.
- h. Multipurpose Space: Provide two Multipurpose Spaces capable of being divided into three equal spaces each by a ceiling hung, operable partition. The operable partitions shall have a minimum STC rating of 45. Each of the three spaces must have a separate exit. Each partitioned space is intended to provide adequate space for training of 30 persons in a three classroom arrangement or to support large gatherings of approximately 100 persons with the partitions retracted. Each partitioned space shall have a storage room with a net area of 80 square feet. Each storage room shall have lockable double doors. Square footage for storage rooms is included in the overall multipurpose room space allocation.
- i. Scrub Room: Provide two Scrub Rooms with ten rinsing stations each, in an indoor area for soldiers to rinse mud from field gear, boots and clothing. Each rinsing station shall include a combination laundry tray and deep laundry sink with hot and cold water, spray nozzle on flexible hose, drain and sand interceptor.
- j. Weapons Cleaning: Provide two Weapons Cleaning rooms each with a 30 inch deep, continuous built-in counter top work area.
- k. Arms Vault: Provide two Arms Vaults for storage of arms, ammunition, and explosives. Arms vault shall comply with Appendix G of AR 190-11, Physical Security of Arms, Ammunition, and Explosives. Arms vault door shall incorporate a steel dutch-door type day-gate with a steel issue shelf built into the lower leaf of the day-gate.
- l. Company Supply: Provide two Company Supply rooms. Each Company Supply room shall be used as storage space for company supplies and equipment, weapons, and consumable supplies. Shipping and receiving functions are performed from company supply area. A seven foot high by eight foot wide, overhead coiling door with ramp provides exterior vehicular access. A built-in lockable issue counter with laminated sliding glass window shall be integrated with a rolling shutter door between this room and the corridor. Issue counter opening shall be 36 inches wide and 42 inches high minimum.
- m. Secure Storage: In each Company Supply room, provide a Secure Storage room for high value items of electronic equipment, e.g. night goggles. Secure Storage room is separated from the Company Supply area with full height, security wire mesh partition with padlocked wire door. Each Secure Storage room shall have a minimum of six, 18 inch wide storage shelves, spaced at 15 inches on center vertically and capable of



supporting a minimum of 20 pounds per linear foot. Total linear footage of storage shelves shall be three times the perimeter of the Secure Storage room.

- n. Profile Recovery: Provide two Profile Recovery rooms. These rooms provide an exercise area for injured trainees. The Profile Recovery rooms house fitness equipment, e.g. treadmills, stationary bicycles, Stairmasters. All fitness equipment is GFGI
- o. Covered Assembly Area: Provide an outside, sheltered space for equipment maintenance, weapons cleaning, and pre/post-training preparation and clean-up. Provide cabling/outlets for 3 telephones.

#### 3.2.2.1.4. Space Allocation

<b>B/COF MINIMUM SQUARE FOOTAGE REQUIREMENTS NET SQUARE FEET (NSF) @ FORT LEE, VA</b>						
	<b>1<sup>ST</sup> FLOOR</b>	<b>2ND FLOOR</b>	<b>3RD FLOOR</b>	<b>4TH FLOOR</b>	<b>5TH FLOOR</b>	<b>TOTAL</b>
<b>SLEEPING UNIT – 30 UNITS PER FLOOR</b>						
<b>BEDROOM</b>	216	216	216	216	216	32,400
BATHROOM	31	31	31	31	31	4,650
ENTRY	AS NEEDED	AS NEEDED	AS NEEDED	AS NEEDED	AS NEEDED	
UTILITY CLOSET	AS NEEDED	AS NEEDED	AS NEEDED	AS NEEDED	AS NEEDED	
<b>COMMON AREA</b>						
LOBBY AND VESTIBULES	AS NEEDED – MINIMUM 10'-0" WIDE					
STAIR	AS NEEDED – STAIRS SHALL BE MINIMUM 4'-6" WIDE					
CORRIDORS AND VESTIBULES	AS NEEDED - MINIMUM 6'-0" WIDE					
DRILL INSTRUCTOR (DI) OFFICE (2 PER FLOOR)	192	192	192	192	192	1,920
CQ STATION (1 ON 1 <sup>ST</sup> FLOOR)	100					100
COMPUTER LEARNING CENTER WITH STORAGE (2 PER FLOOR)	540	540	540	540	540	5,400
DAY ROOM WITH STORAGE (2 PER FLOOR)	540	540	540	540	540	5,400
LAUNDRY 2 PER FLOOR	AS NEEDED					
LUGGAGE STORAGE (2 PER FLOOR)	160	160	160	160	160	1,600
JANITOR (4 ON 1 <sup>ST</sup> FLOOR, 2 PER FLOOR ON 2 <sup>ND</sup> 3 <sup>RD</sup> 4 <sup>TH</sup> AND 5 <sup>TH</sup> FLOORS)	20	20	20	20	20	240
MECHANICAL, TELECOMMUNICATIONS AND ELECTRICAL	AS NEEDED					
BOOT WASH	AS NEEDED					
GENERAL STORAGE (2 PER		50	50	50	50	400

<b>B/COF MINIMUM SQUARE FOOTAGE REQUIREMENTS NET SQUARE FEET (NSF) @ FORT LEE, VA</b>						
	<b>1<sup>ST</sup> FLOOR</b>	<b>2ND FLOOR</b>	<b>3RD FLOOR</b>	<b>4TH FLOOR</b>	<b>5TH FLOOR</b>	<b>TOTAL</b>
FLOOR)						
<b>COMPANY OPERATIONS AREA (2 PER FIRST FLOOR)</b>						
COMPANY COMMANDER (CO)	150					300
EXECUTIVE OFFICER (XO)	110					220
WAITING AREA	250					500
OPS SGT	110					220
1ST SGT	120					240
MEN'S TOILET	AS NEEDED					
WOMEN'S TOILET	AS NEEDED					
VENDING	AS NEEDED					
MULTIPURPOSE SPACE WITH STORAGE	1,700					3,400
SCRUB ROOM	240					480
WEAPONS CLEANING	120					240
ARMS VAULT	200					400
COMPANY SUPPLY	280					560
SECURE STORAGE	100					200
PROFILE RECOVERY	350					700
COVERED ASSEMBLY AREA	3,500					3,500

3.2.3. NOT USED

3.2.4. NOT USED

3.2.5. NOT USED

3.2.6. LEB

Provide 1,000 gross square feet lawn maintenance equipment storage building. LEB shall be divided with partitions into two equal spaces, to provide an individually securable storage space with separate access for each B/COF. Access to each individual storage space shall be through a lockable overhead coiling door minimum eight feet wide by seven feet high.

3.3. SITE REQUIREMENTS

3.3.1. Walks: Provide pedestrian walks within the designated construction area and connect to existing sidewalks, where applicable.

- a. Sidewalks shall be a minimum of 6 feet wide. Troop formation sidewalks shall be a minimum of 15 feet wide. Troop formation sidewalks that are also designed to support emergency and service vehicle traffic shall be a minimum of 20 feet wide per NFPA requirements. Walks paralleling buildings shall be located beyond the eave drip line and at least 5 feet from the foundation.
- b. Non-vehicular pedestrian and troop formation sidewalks shall be constructed of Portland Cement Concrete and have a minimum nominal thickness of 4 inches. Joint patterns shall be designed in accordance with American Association of State Highway and Transportation Officials (AASHTO) standards and shall be uniform and symmetrical. The length to width ratio shall not exceed 1.25 for non-reinforced pavements.
- c. Troop formation sidewalks designed to support emergency and service vehicle traffic will be considered roadway pavements and shall be designed to meet AASHTO standards. Vehicular supported walks shall be constructed of Portland Cement Concrete and shall have a minimum nominal thickness of 7 inches. Joints shall be designed in accordance with AASHTO standards and shall be uniform and symmetrical. The length to width ratio shall not exceed 1.25 for non-reinforced pavements.

### 3.3.2. Physical Fitness Training Areas

Outdoor training areas, particularly those that are needed for physical fitness, should be located to the interior areas of the AIT Complex. The minimum mandatory exterior training areas for the complex include one running track (Not in Contract) per complex, one physical training (PT) pit per B/COF and four 4-station climbing bar sets per B/COF.

#### 3.3.2.1. Running Track: NOT IN CONTRACT

3.3.2.2. PT Pits: For Phase I provide one PT Pit and four 4-station climbing bars for each B/COF. Refer to Appendix J-Drawings for physical training equipment. In Phase 2 (Not In Contract) an additional PT Pit and four 4-station climbing bars close to the building shall be provided. Each pit shall be a minimum of 18,500 square feet. Square pits are desired, but pits may be adjusted to meet site conditions. The pits shall be located to the rear of each B/COF and can either be stand alone facilities or located within the interior of the track. Separation of PT pits located within the track shall be visibly defined. PT pits will be used for hand to hand combat drills, as well as, calisthenics. The PT pit shall be constructed of a durable, low maintenance surface, such as a 2 inch extruded monofilament synthetic turf surface with sand and rubber infill or a similar application. An option that may be considered is artificial "field turf". Surface and subsurface drainage shall be designed for the PT pits. No standing water shall be allowed on the PT pits. No canopy coverings may be provided over the PT pits, and no fences shall be provided. Pit lighting level shall be a minimum of 3 foot-candles and shall be switch operated. Provide a timer switch for the lighting at each PT Pit. The timer switch will turn on the PT Pit lights and then automatically shut them off after the timer has run out. This timer should be mounted to one of the PT Pit light poles at each pit and shall be accessible to the occupant for PT exercises.

### 3.3.3. Site Structures and Amenities

- a. Dumpster Area: The Contractor shall locate, design, and construct the dumpster enclosure area(s) and screening. Dumpster screening shall be aesthetically and architecturally compatible with the building it serves and shall be designed in accordance with the Installation's guidelines. Locate the dumpster areas in accordance with UFC 4-010-01 "DoD Minimum Antiterrorism Standards for Buildings". Position the GFGI dumpsters outside of restricted areas to allow for servicing activities.

### 3.3.4. Site Functional Requirements

- a. Privately Owned Vehicle (POV) Parking: POV parking, within the designated AIT Complex construction area, shall be designed and constructed by the Contractor. POV parking, outside the designated AIT Complex construction area, shall be designed and constructed by the Site Contractor. The location of the POV parking area(s) shall be designed based on the Installation's site constraints. Parking can either be consolidated or spread out along the perimeter of the complex. The Contractor shall ensure that the location of parking complies with UFC 4-010-01. See paragraph 5.2.3 VEHICLE PAVEMENTS for additional information. POV parking shall be provided as follows:

- B/COF- 18 spaces per 300 man B/COF
- BNHQ- 23 spaces total which includes two accessible spaces and three visitor spaces
- BDEHQ- 50 spaces total which includes two accessible spaces and five visitor spaces
- DFAC- 65 spaces total which includes three accessible spaces

Service Drives: The Contractor shall provide service drives to each building. The drives shall be located in accordance with UFC 4-010-01. Where applicable, access to the drives shall be restricted as required by UFC 4-010-01. The pavement design shall be as required by paragraph 5.2.3 VEHICLE PAVEMENTS. Minimum access drive width shall be 24 feet. The Contractor shall design and construct the drives with curb and gutter when necessary for drainage purposes. Minimum turning radius shall be designed as required for emergency vehicle access.

- b. Troop Formation/Assembly Areas: Pavements for Troop formation/assembly areas, such as the pavement beneath the outdoor "Covered Assembly Areas" shall be constructed of Portland Cement Concrete and having a minimum nominal thickness of 4 inches. Troop formation areas that are designed to also support emergency and service vehicle traffic will be designed as roadway pavements and designed to meet AASHTO standards. Vehicular supported walks shall be constructed of Portland Cement Concrete having a minimum nominal thickness of 7 inches. Joint patterns shall be designed in accordance with AASHTO standards and shall be uniform and symmetrical. Joint patterns shall be designed in accordance with AASHTO standards and shall be uniform and symmetrical. The length to width ratio shall not exceed 1.25 for non-reinforced pavements.

### 3.3.5. NOT USED

## 3.4. ARCHITECTURAL REQUIREMENTS

### 3.4.1. Hardware

#### a. NOT USED

- b. Finish Hardware: All hardware shall be consistent and shall conform to ANSI/BMHA standards for Grade 1. All requirements for hardware keying shall be coordinated with the Contracting Officer. Hardware finish shall conform to ANSI/BHMA A156 18; finish shall be polished stainless steel or chrome plated non-ferrous metal. Extension of the existing installation keying system shall be provided. Installation keying system is BESTLOCK. Locksets shall have interchangeable cores. Cores shall have no fewer than seven pins. Cores for locksets other than those for mechanical, electrical, janitor's closets and telecommunications rooms shall be manufactured by BESTLOCK Corporation. Locksets for mechanical, electrical, janitor's closets and telecommunications rooms only shall be keyed to the existing Installation utilities master keying system. Deadbolt locks shall be installed on mechanical, electrical and telecommunications rooms keyed to the Installation keying system. Disassembly of knob or lockset shall not be required to remove core from lockset. All locksets and exit devices shall accept same interchangeable cores. Plastic cores are unacceptable. Door hardware and security requirements must be coordinated with the functional requirements, the room-by-room criteria, and the electrical security/fire alarm system requirements of this document. Provide all hardware necessary to meet the requirements of applicable codes for fire doors and exit doors. Provide closers for all doors opening to corridors and as required by codes.

### 3.4.2. Special Acoustical Requirements

3.4.2.1. Exterior walls and roof/floor/ceiling assemblies, doors, windows and interior partitions shall be designed to provide for attenuation of external noise sources such as airfields in accordance with applicable criteria. Provide sound insulation to meet a minimum rating of STC 42 at walls and floor/ceiling assemblies. At interior doors provide solid core wood doors in metal frame with sound insulation to meet a minimum rating of STC 33. In addition to the sound insulation required, video conferencing areas shall meet a Noise Criteria (NC) 30 rating in accordance with ASHRAE Fundamentals Handbook. Provide sound insulation to meet a minimum rating of STC 50/IIC 55 at floors separating sleeping spaces.

3.4.2.2. Sound conditions and levels for interior spaces, due to the operation of mechanical and electrical systems and devices, shall not exceed levels as recommended by ASHRAE handbook criteria. Provide acoustical treatment for drain lines and other utilities to prevent noise transmission into the interior of sleeping units.

### 3.4.3. Exterior Design Objectives

3.4.3.1. Exterior Walls: Provide durable materials. The use of an Exterior Insulation Finish System (EIFS) is not permitted.

3.4.3.2. Roof System: Minimum roof slope for membrane roof systems shall be 1/4 inch per foot. Minimum roof slope for pitched roof systems shall be 3 inches per foot. Membrane roof systems shall be fully adhered. Structural standing seam metal roofs shall comply with the requirements of ASTM E 1592. Roof system shall be Underwriters Laboratory (UL 580 Class 90) rated or Factory Mutual Global (FM) I-90 rated. Roof system shall comply with applicable criteria for fire rating.

- a. Roof Mounted Equipment: For roof mounted equipment, provide permanent access walkways and platforms to protect roof. Roof mounted equipment on pitched roof systems is unacceptable. Roof mounted equipment on membrane roof systems shall be completely screened by the roof parapet.
- b. Roof access from building exterior is prohibited.
- c. Snow Guards: Where snow guards are necessary to protect walkways and equipment below, design and install per MP-05-6443-Snow Guards on Metal Roofs as published by CRELL.

3.4.3.3. Trim and Flashing: Gutters, downspouts, and fascias shall be factory pre-finished metal and shall comply with SMACNA Architectural Sheet Metal Manual.

3.4.3.4. Bird Habitat Mitigation: The Contractor shall provide details in the design necessary to eliminate the congregating and nesting of birds at, on, and in the facility.

3.4.3.5. Exterior Doors and Frames:

- a. Main Entrance Doors: Aluminum storefront doors and frames with Architectural Class 1 anodized finish, fully glazed, with medium or wide stile for entry into lobbies or corridors. Provide doors complete with frames, framing members, subframes, transoms, sidelights, trim, applied muntins, and accessories. Framing systems shall have thermal-break design. Storefront systems shall comply with wind-load requirements of applicable codes and criteria and shall comply with the requirements of UFC 4-010-01.
- b. Other Exterior Doors: Exterior doors and frames opening to spaces other than corridors or lobbies shall be galvanized insulated hollow metal and comply with ANSI A250.8/SDI 100. Doors shall be heavy duty (grade 2) insulated with 18-gage steel cladding; top edge closed flush; A60 galvanized. Frames shall be 12-gauge, with continuously welded mitered corners and seamless face joints. Doors and frames shall be constructed of hot dipped zinc coated steel sheet, complying with ASTM A653, Commercial Steel, Type B, minimum A40 coating weight; factory primed. Fire-rated openings shall comply with applicable codes, and the requirements of the labeling authority. Door and frame installation shall comply with applicable codes and criteria including UFC 4-010-01.

3.4.3.6. Exterior Windows: Provide in sleeping modules: double hung, operable, insulated, high efficiency window systems, with thermally broken frames complying with applicable codes and criteria including UFC 4-010-01. Provide in rest of facility: insulated, high efficiency window systems, with thermally broken frames complying with applicable codes and criteria including UFC 4-010-01. Curtain wall systems shall be capable of withstanding area wind loads, thermal and structural movement required by location and project requirements, and shall comply with applicable codes and criteria including UFC 4-010-01.

3.4.3.7. Exterior Louvers: Exterior louvers shall have bird screens and shall be designed to exclude wind-driven rain. Exterior louvers shall be made to withstand wind loads in accordance with the applicable codes. Wall louvers shall bear the Air Movement & Control Association (AMCA) International certified ratings program seal for air performance and water penetration in accordance with AMCA 500-D and AMCA 511. Louver finish shall be factory applied.

3.4.4. Building Interior

Interior Design Objectives: Provide durable materials and furnishings that are easily maintained and replaced. Maximize use of daylighting. Provide interior surfaces that are easy to clean and light in color. Design B/COF barracks area with a residential ambience. Design B/COF company operations area with an office ambience.

3.4.4.1. Signage: At each sleeping unit, provide two room number and changeable two-line message strip signs, one on each side of entry door. Changeable message strip signs shall be of same construction as standard room signs to include a clear sleeve that will accept a paper or plastic insert with identifying changeable text. The insert shall be prepared typeset message photographically enlarged to size and mounted on paper card stock.

3.4.4.2. Bulletin Boards: In each B/COF provide one centrally located bulletin board per floor. Each bulletin board shall be 4 feet high and 6 feet wide and shall have a header panel and lockable, glazed doors.

3.4.4.3. Corner Guards: Provide surface mounted, high impact resistant, integral color, snap-on type resilient corner guards, extending from floor to ceiling for wall and column outside corners in high traffic areas. Factory fabricated end closure caps shall be furnished for top and bottom of surface mounted corner guards.

3.4.4.4. Chair Rail: Chair rails shall be installed in areas prone to hi-impact use, such as corridors and lobby seating areas.

3.4.4.5. Casework: Provide cabinets complying with Architectural Woodwork Institute Quality Standards. Countertops shall have waterfall front edge and integral coved backsplash.

3.4.4.6. Window Treatment: Provide horizontal mini blinds at all exterior windows. Uniformity of window covering color and material shall be maintained to the maximum extent possible throughout each building. Blinds in B/COF barracks area shall be room darkening mini blinds.

3.4.4.7. Toilet Accessories: Furnish and install the items listed below and all other toilet accessories necessary for a complete and usable facility. All toilet accessories shall be Type 304 stainless steel with satin finish.

a. Public Toilets/showers: Accessories shall include the following items.

- (1) Glass mirrors on stainless steel frame and shelf – at each lavatory
- (2) Hands free liquid soap dispenser – at each lavatory
- (3) Hands free paper towel dispenser at each lavatory/toilet area
- (4) Waste receptacle – recessed mounted at each lavatory/toilet area
- (5) Sanitary napkin disposal at each female toilet
- (6) Toilet paper dispenser – lockable multiple roll at each toilet
- (7) Sanitary toilet seat cover dispenser – at each toilet stall
- (8) Grab bars – as required by ABA.
- (9) Shower curtain rod - extra heavy duty
- (10) Shower curtain – white anti-bacterial nylon/vinyl fabric shower curtain
- (11) Soap dish – in shower
- (12) Robe hook – adjacent to shower enclosure entry
- (13) Toilet Partitions

b. Sleeping Unit Bathroom: Accessories shall include the following items.

- (1) Two heavy duty towel bars – minimum 24 inches wide each
- (2) Mirrored medicine cabinet
- (3) Soap dish – in shower
- (4) Combination soap dish/toothbrush holder – at each lavatory
- (5) Double robe hook - on inside of bathroom door
- (6) Toilet paper holder
- (7) Shower curtain rod - extra heavy duty

- (8) Shower curtain – white anti-bacterial nylon/vinyl fabric shower curtain
- c. Drill Instructor Toilet/Shower: Accessories shall include the following items.
  - (1) Glass mirrors on stainless steel frame and shelf – at each lavatory
  - (2) Hands free liquid soap dispenser – at each lavatory
  - (3) Hands free paper towel dispenser
  - (4) Waste receptacle - recessed mounted
  - (5) Toilet paper dispenser – lockable multiple roll at each toilet
  - (6) Shower curtain rod - extra heavy duty
  - (7) Shower curtain – white anti-bacterial nylon/vinyl fabric shower curtain
  - (8) Soap dish – in shower
  - (9) Robe hook – in shower dressing area

3.4.4.8. Recessed Fire Extinguisher Cabinets: Furnish and install recessed fire extinguisher and Automated External Defibrillator (AED) cabinets as required by applicable codes and criteria. Furnish a list of installed recessed fire extinguisher cabinets and AED's (including location, size and type) to the Contracting Office Representative.

### 3.4.5. Finishes

#### 3.4.5.1. Paint

- a. All paints used shall be listed on the "Approved Product List" of the Master Painters Institute (MPI). Application criteria shall be as recommended by MPI guide specifications for the substrate to be painted and the environmental conditions existing at the project site.
- b. Exterior surfaces, except factory pre-finished material or exterior surfaces receiving other finishes shall be painted a minimum of one prime coat and two finish coats. Paints having a lead content over 0.06 percent by weight of nonvolatile content are unacceptable. Paints containing zinc-chromate, strontium-chromate, mercury or mercury compounds, confirmed or suspected human carcinogens shall not be used on this project. Exterior paints and coating products shall be classified as containing low volatile organic compounds (VOCs) in accordance with MPI criteria. Application criteria shall be as recommended by MPI guide specifications. Provide an MPI Gloss Level 5 Finish (semi-gloss), unless otherwise specified.
- c. Interior surfaces, except factory pre-finished material or interior surfaces receiving other finishes, shall be painted a minimum of one prime coat and two finish coats. Paints having a lead content over 0.06 percent by weight of nonvolatile content are unacceptable. Paints containing zinc-chromate, strontium-chromate, mercury or mercury compounds, confirmed or suspected human carcinogens shall not be used on this project. Interior paints and coating products shall contain a maximum level of 150 grams per liter (g/l) of VOCs for non-flat coatings and 50 g/l of VOCs for flat coatings. Provide an MPI Gloss Level 5 Finish (semi-gloss) in wet areas and a flat finish in all other areas.

#### 3.4.5.2. Minimum Interior Finishes-General

- a. Designers are not limited to finishes listed in the following INTERIOR FINISHES table(s) and are encouraged to offer higher quality finishes.
- b. Wall, ceiling and floor finishes and movable partitions shall conform to the requirements of the NFPA and UFC 3-600-01 Fire Protection Engineering for Facilities. Where code requirements conflict, the most stringent code requirement shall apply.
- c. Carpet shall not be used as a floor finish in the B/COF. Carpet shall be minimum of 2 yarn ply, modular tile conforming to ISO 2551, ASTM D 418, ASTM D 5793, ASTM D 5848, solution dyed, tufted, cut and loop pile, commercial 100% branded (federally registered trademark) nylon continuous filament. Vinyl composition tile

(VCT) shall be minimum 1/8 inch thick, conforming to ASTM F 1066, Class 2, through pattern tile, Composition 1, asbestos free, with color and pattern uniformly distributed throughout the thickness of the tile.

- d. All walls shall be painted gypsum board, except where stated otherwise. Use impact resistant gypsum board in vestibules, classrooms, day rooms, corridors, stairs, laundry, vending areas and storage areas.
- e. All grout used for ceramic and quarry tile applications shall be mold and mildew resistant.

#### 3.4.5.3. B/COF Interior Finishes

B/COF INTERIOR FINISHES																	
	FLOORS					BASE			WALLS				CEILING				REMARKS
	RESILIENT FLOORING	PORCELAIN OR QUARRY TILE	CERAMIC TILE	RECESSED ENTRY MAT	SEALED CONCRETE	RESILIENT BASE	PORCELAIN OR QUARRY BASE	CERAMIC BASE	GYPSUM WALL BOARD-PAINT	REINFORCED, FULLY GROUTED CMU OR CONCRETE	CERAMIC TILE	INSULATED STORE FRONT SYSTEM, LAMINATED GLASS	GYPSUM WALL BOARD-PAINT	ACOUSTICAL CEILING TILE	REINFORCED CONCRETE	MINIMUM HEIGHT 8'-0" UNLESS STATED OTHERWISE	REFER TO NOTE.
BEDROOM	•					•			•				•			9'	
BATHROOM			•					•	•		•		•				NOTES 1 AND 4
ENTRY	•					•			•				•				
UTILITY					•	•			•				•				
LOBBY AND VESTIBULES		•		•			•		•			•	•			9'	
STAIRS	•				•	•			•				•				NOTE 8
CORRIDORS		•					•		•				•			9'	
DI OFFICE	•					•			•					•			
DI TOILET			•					•	•		•		•				NOTES 1 AND 4
CQ STATION		•					•		•				•			9'	
COMPUTER LEARNING CENTER	•					•			•					•			NOTE 3
DAYROOM	•					•			•					•			NOTES 3 AND 5
LAUNDRY		•					•		•				•				NOTE 4 AND 10
LUGGAGE STORAGE	•					•			•					•			
GENERAL STORAGE	•					•			•				•				
JANITOR			•					•	•		•		•				NOTE 2
MECHANICAL					•	•			•				•				NOTE 7 AND 10
TELECOM	•					•			•				•				
ELECTRICAL					•	•			•				•				



B/COF INTERIOR FINISHES																	
	FLOORS					BASE			WALLS				CEILING				REMARKS
	RESILIENT FLOORING	PORCELAIN OR QUARRY TILE	CERAMIC TILE	RECESSED ENTRY MAT	SEALED CONCRETE	RESILIENT BASE	PORCELAIN OR QUARRY BASE	CERAMIC BASE	GYPSUM WALL BOARD-PAINT	REINFORCED, FULLY GROUTED CMU OR CONCRETE	CERAMIC TILE	INSULATED STORE FRONT SYSTEM, LAMINATED GLASS	GYPSUM WALL BOARD-PAINT	ACOUSTICAL CEILING TILE	REINFORCED CONCRETE	MINIMUM HEIGHT 8'-0" UNLESS STATED OTHERWISE	REFER TO NOTE.
CO	•					•			•					•			NOTE 6
XO	•					•			•					•			
WAITING AREA	•					•			•					•		9'	
OPS SGT	•					•			•					•			
1 <sup>ST</sup> SGT	•					•			•					•			
MEN'S TOILET			•					•	•		•		•				NOTE 1 AND 10
WOMEN'S TOILET			•					•	•		•		•				NOTE 1 AND 10
MULTI PURPOSE SPACE	•					•			•					•		9'	NOTE 3
SCRUB ROOM					•	•			•				•				NOTE 10
WEAPONS CLEANING					•	•			•				•				
ARMS VAULT					•	•				•					•		
COMPANY SUPPLY	•					•			•				•				
SECURE STORAGE	•					•			•				•				
PROFILE RECOVERY	•					•			•					•			NOTE 3
COVERED ASSEMBLY AREA					•												NOTE 9
1. ALL WET WALLS IN TOILET ROOMS SHALL HAVE 4'-0" HIGH CERAMIC TILE WAINSCOT. ALL SHOWERS SHALL HAVE FULL HEIGHT TILE WALLS. VANITY TOPS SHALL BE CAST 100 PERCENT ACRYLIC POLYMER SOLID SURFACING MATERIAL WITH WATERFALL FRONT EDGE AND INTEGRAL COVED BACKSPLASH.																	
2. WALLS ADJACENT TO JANITOR'S SINK SHALL HAVE A 4'-0" HIGH CERAMIC TILE WAINSCOT.																	
3. USE SAME FINISHES IN ADJACENT CLOSET OR STORAGE ROOM.																	
4. ALL COUNTERS SHALL HAVE A MINIMUM OF 4" HIGH BACKSPLASH.																	
5. IN VENDING OR RECYCLABLES STORAGE AREA, MATCH FLOORING, WALL, AND CEILING FINISHES TO THOSE OF ADJACENT AREA.																	
6. EXTEND PARTITIONS TO DECK. PROVIDE SOUND INSULATION TO MEET A MINIMUM RATING AT DOORS AND WALLS OF STC 50.																	
7. CEILING MAY BE PAINTED EXPOSED STRUCTURE IF ALLOWED BY APPLICABLE CODE.																	
8. RISERS SHALL BE PAINTED STEEL. STAIR LANDINGS AND TREADS SHALL HAVE RESILIENT FLOORING OR SEALED CONCRETE. PROVIDE TREADS WITH SLIP RESISTANT NOSING.																	
9. PAINT STRUCTURE.																	
10. PROVIDE FLOOR DRAIN IN CENTER OF ROOM. THIS DOES NOT APPLY TO LIVING UNIT																	

B/COF INTERIOR FINISHES																	
	FLOORS					BASE			WALLS			CEILING			REMARKS		
	RESILIENT FLOORING	PORCELAIN OR QUARRY TILE	CERAMIC TILE	RECESSED ENTRY MAT	SEALED CONCRETE	RESILIENT BASE	PORCELAIN OR QUARRY BASE	CERAMIC BASE	GYPSUM WALL BOARD-PAINT	REINFORCED, FULLY GROUTED CMU OR CONCRETE	CERAMIC TILE	INSULATED STORE FRONT SYSTEM, LAMINATED GLASS	GYPSUM WALL BOARD-PAINT	ACOUSTICAL CEILING TILE	REINFORCED CONCRETE	MINIMUM HEIGHT 8'-0" UNLESS STATED OTHERWISE	REFER TO NOTE.
MECHANICAL CLOSETS																	

3.4.5.4. NOT USED

3.4.5.5. NOT USED

3.4.5.6. NOT USED

3.4.5.7. LEB Interior Finishes:

Floors shall be sealed concrete with a resilient base. Walls shall be painted impact resistant gypsum wallboard.

3.4.5.8. B/COF Furniture Chart

<b>B/COF FURNITURE CHART</b>		
<b>Description</b>	<b>Comments</b>	<b>Furniture Required</b>
Executive Office (CO)	Private Office	U-shaped executive desk with two pedestals, hutch, one 4-drawer lateral file, two guest chairs, one executive chair
Executive Office (XO)	Private Office	L-shaped double pedestal desk unit, hutch, one 4-drawer lateral file, two guest chairs, one task chair
Office 1 (1 <sup>ST</sup> SGT)	Private Office	L-shaped double pedestal desk unit, hutch, two 4-drawer lateral files, two guest chairs, one executive chair
Office 2 (OPS SGT)	Private Office	L-shaped double pedestal desk unit, hutch, two 4-drawer lateral files, two guest chairs, one task chair
DI Office	48 NSF Open Workstations, Waiting Area	Two systems furniture workstations with work surfaces, file pedestals, and overhead storage, two task chairs, three guest chairs
Waiting Area	48 NSF Open Workstations, Waiting Area	Two systems furniture workstations with work surfaces, file pedestals, and overhead storage, two task chairs, two guest chairs, three waiting area chairs, one side table

<b>B/COF FURNITURE CHART</b>		
<b>Description</b>	<b>Comments</b>	<b>Furniture Required</b>
Computer Learning Center	Classroom	15 computer carrels, one storage cabinet, 15 task chairs
Multi-Purpose	Classroom	100 tablet-arm chair desks, movable partitions to divide large classroom space into three equally-sized spaces
Company Supply	Storage	One systems furniture workstation with work surfaces, file pedestals, and overhead storage, one task chair, 19 heavy-duty shelving units
Laundry	Utilitarian	Three folding/hanging tables
Lobby-1st floor	CQ and Building Reception Area	One reception center with two task chairs, six guest chairs
Profile Recovery	Exercise Room	Exercise equipment
Day Room		5-seat upholstered arrangement with side tables, 36" round table with four guest chairs, entertainment system storage, pool table and/or table tennis
Lobby - 2 <sup>nd</sup> through 5 <sup>th</sup> floors	Waiting Area	7-seat upholstered arrangement with side tables
Sleeping Module	Dormitory Room	Two beds, two nightstands, two desks with hutch, two desk chairs, two lamps

3.4.5.9. Not Used

3.4.5.10. Not Used

### 3.5. STRUCTURAL REQUIREMENTS

Design and construct as a complete system in accordance with APPLICABLE CRITERIA.

3.5.1. Live Loads: Design live loads shall be per the IBC but not lower than the following minimums.

- (a) Elevated floors 60 pounds per square foot (psf)
- (b) Slab on grade 150 psf
- (c) Centralized laundry area 150 psf, but not less than actual equipment loads.

### 3.6. COMPLIANCE WITH THE ENERGY POLICY ACT OF 2005 (EPACT 2005)

#### 3.6.1. EPACT 2005 Requirement

The AIT B/COF building, including the building envelope, HVAC systems, service water heating, power, and lighting systems shall be designed to achieve an energy consumption that is at least 30% below the consumption of a baseline building meeting the minimum requirements of ANSI/ASHRAE/IESNA Standard 90.1 (see paragraph 5.9 Energy Conservation)

### 3.6.2. Target Energy Consumption Budget - AIT BCOF

The target energy consumption budget (excluding plug loads) for AIT B/COF facility located in Climate Zone 4A is 52 kBtu per ft<sup>2</sup> per year or less.

### 3.6.3. Prescriptive Path (Use of Technology Solution Set)

The technology solution set shown in the table below contributes to achievement of the above energy performance and life cycle cost effectiveness requirements for an AIT B/COF facility in the indicated DOE climatic zone.

**Climate Zone 4A, Prescriptive Technology Solution Table**

Item	Component	30% Solution
<b>Roof</b>	Attic	R-50
	Surface reflectance	0.27
<b>Walls</b>	Light Weight Construction	R-20
<b>Exposed Floors</b>	Mass	R-20
<b>Slabs</b>	Unheated	NR <sup>(2)</sup>
<b>Doors</b>	Swinging	U-0.70
	Non-Swinging	U-1.45
<b>Infiltration</b>		0.25 cfm/ft <sup>2</sup> @ 75 Pa <sup>(3)</sup>
<b>Vertical Glazing</b>	Window to Wall Ratio (WWR)	10% - 20%
	Thermal transmittance	U-0.45
	Solar heat gain coefficient (SHGC)	0.31
<b>Interior Lighting</b>	Lighting Power Density (LPD)	0.9 W/ft <sup>2</sup>
	Ballast	Electronic ballast
<b>HVAC</b>	Air Conditioner	4-Pipe Fan Coil with central chiller and boiler plus DOAS <sup>(4)</sup> with 14.0 SEER DX coil (3.52 COP) and HHW coil on central boiler  SAT control 55°F – 62°F with OAT 75° – 54°F
	Gas Furnace	none
	ERV	70% - 75% sensible effectiveness
<b>Economizer</b>		no
<b>Ventilation</b>	Outdoor Air Damper	Motorized control
	Demand Control	NR

	Laundry Room	Decoupled <sup>(5)</sup>
<b>Ducts</b>	Friction Rate	0.08 in. w.c./100 feet
	Sealing	Seal class B
	Location	Interior only
	Insulation level	R-6 <sup>(6)</sup>
<b>Service Water Heating</b>	Gas storage	90% E <sub>t</sub>

Notes for Prescriptive Solution Technology Table:

(1) NOT USED

(2) NR means there is no requirement or recommendation for a component in this climate.

(3) Increased Building Air tightness. Building air leakage (measured in cfm/ft<sup>2</sup>) is the average volume of air (measured in cubic feet per minute) that passes through a unit area of the building envelope (measured in square feet) when the building is maintained at a specified internal pressure (measured in Pascals). Testing requirements are specified in Chapter 5..

(4) Dedicated Outdoor Air System. A central dedicated outdoor air system (DOAS) providing the following:

(a) Outside air for building indoor air quality and humidity control

(b) Make-up air for bathroom and kitchen exhausts

(c) Building pressurization to prevent infiltration which allows for reduction of heating/cooling and moisture loads on the system.

NOTE: The Central DOAS does not provide sensible heating or cooling. Sensible loads are provided by a complementing heating and cooling system

(5) Decoupling exhaust and supply systems for laundry rooms. To reduce unneeded energy use for heating and cooling of the make-up air and for air transportation of supply and exhausted air from the dryers, laundry exhaust and supply systems are separated in the efficient building model from the rest of the building exhaust and supply systems. Laundry exhaust system and corresponding make-up systems operate only when dryers are operating.

(6) The duct and pipe insulation values are from the ASHRAE Advanced Energy Design Guide for Small Offices.

All design features of this EPACT 2005 compliant AIT BCOF not described above will be in accordance with the minimum requirements of ANSI/ASHRAE/IESNA Standard 90.1-2007 including conformance with paragraph 5.9.2, which requires purchase of Energy Star and FEMP designated products.

#### 3.6.4. Compliance Path

When the “Compliance Path” is selected, the facility design shall include a uniquely developed technology solution set which can be shown by the design analysis (using facility energy simulation software) not to exceed the target energy consumption budget stated in 3.6.2 above and meet all the criteria in the DOE interim final rule: “Energy Conservation Standards for New Federal Commercial and Multi-Family High-Rise Residential Buildings and New Federal Low-Rise Residential Buildings”.

### 3.6.4.1. Schedules

If a unique technology solution set method of compliance is chosen then the following facility schedules must be used in all facility energy simulations for purposes of showing compliance with 3.6.4. Additionally, for simulation of a baseline building model, the “baseline values” for each component shall be as per ASHRAE Standard 90.1-2004 Building Envelope Requirements table for applicable climate zone and residential construction.

**AIT B/COF Common Area Internal Load Schedules**

Hr	Occupancy			Lighting			Washer/Dryer Use			Washer SHW		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
1-6	0.00	0.00	0.00	0.30	0.30	0.30	0.00	0.00	0.00	0.00	0.00	0.00
7-10	0.20	0.20	0.20	0.30	0.30	0.30	0.00	0.00	0.00	0.00	0.00	0.00
11-18	0.00	0.00	0.00	0.30	0.30	0.30	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.80	0.80	0.80	0.00	0.00	0.00	0.00	0.00	0.00
20-21	0.20	0.20	0.20	0.80	0.80	0.80	0.50	0.50	0.50	0.50	0.50	0.50
22-23	0.40	0.40	0.40	0.80	0.80	0.80	1.00	1.00	1.00	1.00	1.00	1.00
24	0.20	0.20	0.20	0.80	0.80	0.80	0.50	0.50	0.50	0.50	0.50	0.50
Peak	5 occ/floor			1.0 W/ft <sup>2</sup> (10.8 W/m <sup>2</sup> )			8.4 kW/floor			53.3 gal/hr/flr (202 L/hr/flr)		

**AIT B/COF Sleeping Unit Internal Load Schedules**

Hr	Occupancy			Lighting			Plug Loads			Service Hot Water		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
1-5	0.80	0.75	0.75	0.20	0.20	0.20	0.20	0.20	0.20	0.00	0.00	0.00
6	0.70	0.65	0.75	0.40	0.30	0.20	0.20	0.20	0.20	0.10	0.10	0.10
7	0.60	0.60	0.70	0.70	0.50	0.30	0.40	0.35	0.20	0.40	0.40	0.40
8	0.50	0.50	1.00	0.50	0.50	0.50	0.40	0.40	0.40	0.20	0.20	0.20
9	0.25	0.25	0.00	0.20	0.20	0.20	0.30	0.40	0.40	0.00	0.00	0.00
10-17	0.20	0.20	0.20	0.20	0.20	0.20	0.30	0.30	0.30	0.00	0.00	0.00
18	0.30	0.30	0.30	0.50	0.50	0.50	0.50	0.50	0.50	0.10	0.10	0.10
19	0.50	0.30	0.30	0.70	0.70	0.70	0.50	0.50	0.50	0.10	0.10	0.10
20	0.50	0.50	0.50	0.70	0.70	0.70	0.60	0.50	0.50	0.10	0.10	0.10
21	0.70	0.50	0.50	0.70	0.70	0.70	0.60	0.50	0.50	0.00	0.00	0.00
22	0.70	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.00	0.00	0.00
23	0.80	0.75	0.75	0.40	0.40	0.40	0.40	0.50	0.50	0.00	0.00	0.00
24	0.80	0.75	0.75	0.20	0.20	0.20	0.20	0.20	0.20	0.00	0.00	0.00
Peak	2 occ/unit			1.1 W/ft <sup>2</sup> (10.8 W/m <sup>2</sup> )			1.7 W/ft <sup>2</sup> (18 W/m <sup>2</sup> )			40 gal/hr (114 L/hr)		

**AIT B/COF Sleeping Unit Thermostat Set-Point Schedules**

Hr	Heating (°F)	Heating (°C)	Cooling (°F)	Cooling (°C)
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<input type="checkbox"/>	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
1-24	68	68	68	20	20	20	75	75	75	24	24	24

**AIT B/COF Unoccupied Zones (ie stairwells, mechanical rooms) Thermostat Set-Point Schedules**

Hr	Heating (°F)			Heating (°C)		
<input type="checkbox"/>	Wk	Sat	Sun	Wk	Sat	Sun
1-24	55	55	55	12.8	12.8	12.8

### 3.7. MECHANICAL REQUIREMENTS

#### 3.7.1. Plumbing

3.7.1.1. Domestic water heating system shall be sized based on 20 gallons of 110 deg F hot water consumption per occupant (3 occupants per room for surge) during morning peak period. Peak period duration shall be 40 minutes (10 minute duration for shower and lavatory use per occupant per sleeping unit plus (2) 5 minute transition periods). Hot water storage capacity shall be based on 75% usable storage and a storage temperature of 140 deg F.

Domestic water pipe sizing to building shall be based on all showers flowing simultaneously at a rate of 2.0 gpm per shower (regardless of actual shower head to be provided) and a minimum 25 PSI to any fixture. Waste stacks, building waste drains, and lift stations shall be sized with consideration to the increased flow rates as well.

Maximum plumbing fixture flow rates shall be as follows:

Water closets shall be flush valve type: 1.28 gallons per flush

Showers: 2.0 gpm

Bathroom sinks: 1.0 gpm

Kitchen sinks: 1.5 gpm

Janitor sinks: 2.0 gpm

3.7.1.2. Provide scrub room and boot wash drains with easily maintainable sand interceptors.

3.7.1.3. Laundry facilities shall be considered commercial laundries with respect to the International Plumbing Code (IPC) and shall be provided with easily maintainable solids interceptor(s) in accordance with the IPC. If dryer vents are manifolded to a common exhaust, provide an easily accessible means of cleanout.

3.7.1.4. Plumbing systems shall be designed overall for Phase I plus Phase II. Plumbing systems and equipment shall only be constructed for Phase I. Adequate space in mechanical rooms and connections for future plumbing systems and equipment shall be provided for future Phase II not in this contract.

#### 3.7.2. Heating, Ventilating and Air-Conditioning (HVAC)

3.7.2.1. All sleeping unit HVAC units shall be located in utility closets accessible only through a corridor access door. Utility closet doors shall be sized for ease of service and maintenance of HVAC units. Access for

maintenance shall not require entry into the sleeping unit. Air filters shall be located in duct mounted filter boxes within the utility closet. Surge population shall be taken into account for HVAC design

3.7.2.2. Each sleeping unit shall be positively ventilated using dedicated outdoor air units. Dedicated outdoor air units (DOAUs) shall continuously supply dehumidified, tempered air ducted directly to each sleeping unit from DOAU. DOAU supply ductwork shall not connect to individual sleeping unit heating/cooling units. Supply air conditions from DOAU shall be between 68 and 75 degree F dry bulb and no greater than 48 degree F dew point. Supply quantity shall be 40 cfm per sleeping unit. Sleeping unit exhaust shall be 25 cfm continuous through a bathroom exhaust. (Note: This exceeds ASHRAE 62.1 but provides compliance with IMC chapter 4 and maintains slight building positive pressurization with respect to dwelling unit exhaust rate of 25 cfm). DOAU unit shall be direct expansion (DX) type and cooling/dehumidification shall be available 24/7/365. Refer to chapter 6 for site specific constraints. The number of exhaust fans and DOAUs shall be the same, and exhaust fans and DOAUs shall be arranged for and shall include exhaust air energy recovery. Exhaust and DOAU systems shall be provided with variable frequency drives (VFDs) and shall be provided with a control logic that provides reduced ventilation rates during periods of low interior humidity and still meet minimum ASHRAE 62.1 requirements.

3.7.2.3. B/COF corridors shall be ventilated per ASHRAE 62.1 by supply from the dedicated outdoor air unit(s).

3.7.2.4. Sleeping unit room temperature control shall be through the direct digital control (DDC) system. Each sleeping unit shall have a heating/cooling unit. Occupant control will include on/off fan selection and an occupant temperature setpoint adjustment mechanism that allows +/- 2 degrees F of adjustment from the DDC programmed set points of 72 degrees F heating and 74 degrees F cooling. Additionally the DDC controls shall monitor each sleeping unit for sub-cooling. The DDC system shall record an alarm event if the space temperature drops below 71 degrees F (adjustable) when the outside air is greater than 85 degrees F (adjustable). Occupant control shall also include ability to select heating or cooling mode. HVAC system shall be able to provide for year round heating or cooling in individual sleeping units as selected by the occupants.

3.7.2.5. HVAC systems shall be designed overall for Phase I plus Phase II. HVAC systems and equipment shall only be constructed for Phase I. Adequate space in mechanical rooms and connections for future HVAC systems and equipment shall be provided for future Phase II not in this contract.

3.7.2.6. Provide single central shutoff switch and low leakage dampers for HVAC systems as per UFC 4-010-01 Appendix B Standard 18.

### 3.7.3. Fire Protection

Fire suppression systems shall be designed in accordance with the latest edition of UFC 3-600-01. However, the B/COF shall be classified as mission essential and shall be provided with sprinkler protection regardless of other criteria or code provisions. The facility shall be protected throughout by a complete automatic sprinkler system. Fire alarm systems shall be addressable type with addressable devices. The type, function and location of the fire alarm annunciator shall be coordinated with the local authority having jurisdiction.

Fire protection systems shall be designed overall for Phase I plus Phase II. Fire protection systems and equipment shall only be constructed for Phase I. Adequate space in mechanical rooms and connections for future fire protection systems and equipment shall be provided for future Phase II not in this contract.

## 3.8. ELECTRICAL AND TELECOMMUNICATIONS REQUIREMENTS

Select electrical characteristics of the power system to provide a safe, efficient, and economical distribution of power based upon the size and types of loads to be served. Use distribution and utilization voltages of the highest level that is practical for the load to be served. The effect of nonlinear loads such as computers, other electronic equipment and electronic ballasts shall be considered and accommodated as necessary. Transient voltage surge protection shall be provided for B/COFs, BNHQs and BDEHQs.



### 3.8.1. Power outlets

Power shall be provided for all installed equipment requiring power including all government furnished contractor installed equipment and all GFGI equipment. Power poles are not allowed. The following shall also be provided.

3.8.1.1. Provide 125-volt duplex receptacles per NFPA 70 in conjunction with the proposed equipment and furniture layouts, and as per other stated requirements elsewhere in the RFP.

3.8.1.2. In addition to receptacles required elsewhere in the RFP provide one 125-volt duplex receptacle per wall in all normally occupied spaces.

3.8.1.3. For housekeeping purposes provide a minimum of one 125-volt, duplex receptacle per corridor and a minimum of one 125-volt duplex receptacle in the lobby. No point along bottom of corridor or lobby walls shall be more than 25 feet from a receptacle.

3.8.1.4. Provide 125-volt duplex receptacles mounted adjacent to lavatories. Provide a minimum of one for every two adjacent lavatories. Each single lavatory shall also be provided a receptacle.

3.8.1.5. Provide a minimum of two 125-volt, 20A duplex receptacles in each mechanical room in addition to NFPA 70 requirements. In addition, provide a minimum of one 125-volt duplex receptacle in each electrical room.

### 3.8.2. Grounding

Grounding shall be provided in accordance with NFPA 70 and UFC 3-580-01 Telecommunications Bldg Cabling System Planning/Design. In addition raised flooring shall be grounded to the building's primary grounding electrode.

### 3.8.3. Lighting

Interior lighting controls shall be provided in accordance with ASHRAE 90.1. Local manual controls shall supplement automatic controls in offices, large open work spaces, bedrooms; and specialized areas such as, computer learning centers, multipurpose spaces and covered assembly areas. Compact fluorescent lamps of 12 watts or less shall not be used. Provided lighting levels shall be within +/- 10% of required lighting levels.

3.8.3.1. An un-switched fixture with emergency ballast shall be provided at the entrance to each arms vault.

3.8.3.2. Covered assembly areas shall be illuminated to a level of 15 foot-candles.

3.8.3.3. Lobbies in B/COF shall be illuminated to a level of 10 foot-candles. CQ station within the first floor lobby shall be illuminated to a level of 30 foot-candles.

3.8.3.4. Mechanical rooms, arms vault, computer learning center, multipurpose space, company supply, day room, weapons cleaning, and electrical rooms shall be illuminated to a level of 30 foot-candles.

3.8.3.5. Not Used

3.8.3.6. Not Used

### 3.8.4. Telecommunications System

Telecommunication outlets shall be provided per applicable criteria based on functional purpose of the space within the building and in accordance with other provisions of this RFP.

3.8.4.1. Provide voice and data connection capability to all workstations.

3.8.4.2. The required connection capability in computer learning centers is a minimum of one voice outlet per room and one data outlet per occupant.

3.8.4.3. Equipment racks shall be 84 inches in height.

3.8.4.4. Cable ladders shall be installed around the entire perimeter of all telecommunications rooms.

3.8.4.5. Service riser conduits in main telecommunications room shall be located behind the equipment racks.

3.8.4.6. Provide each bedroom with two (one per desk) 8-pin modular jacks in separate outlets.

3.8.4.7. Provide a dual (voice and data) 8-pin modular jack outlet at the front of each partitioned area in each and multipurpose space.

### 3.8.5. Video Teleconferencing

Video teleconferencing capability shall be provided in each: multipurpose space

### 3.8.6. Intrusion Detection System (IDS)

IDS shall be provided for each arms vault. IDS shall be included empty conduits with pull wires and junction boxes at the control panels, balanced magnetic switches, motion sensors, and duress switches. An empty conduit with pull wire shall be installed from each IDS control panel to the main communication room. Design Build Contractor shall coordinate with the Installation Physical Security Officer during design for the locations and connection points of IDS devices. The IDS control panels, balanced magnetic switches, motion sensors, and duress switches will be GFGI.

### 3.8.7. CATV

All CATV outlet boxes, connectors, cabling, and cabinets shall conform to UFC 3-580-01 Telecommunications Bldg Cabling System Planning/Design unless noted otherwise. All horizontal cabling shall be homerun from the CATV outlet to the nearest telecommunications room. CATV connectivity shall be provided in: all multipurpose spaces, day rooms, and private offices. See paragraph 6.0 PROJECT SPECIFIC REQUIREMENTS for additional requirements.

### 3.8.8. Not Used

### 3.8.9. Not Used

### 3.8.10. Not Used

## 3.9. FIRE ALARM REQUIREMENTS

3.9.1. There shall be one complete addressable Fire Alarm System for each building. This system shall consist of a Fire Alarm Panel, a communication device, initiating devices and notification devices. Class A addressable systems shall be installed.

3.9.2. All software, software locks, special tools and any other proprietary equipment required to maintain, add devices to or delete devices from the system, or test the Fire Alarm system shall become property of the Government and be furnished to the Contracting Officer's Representative prior to final inspection of the system.

3.9.3. The fire alarm system shall be designed by a professional Fire Protection Engineer and installed by a National Institute for Certification of Engineering Technologies (NICET) 3 technician.

3.9.4. Smoke detectors shall be provided in all bedrooms. Smoke detectors in bedrooms shall be monitored. Tampering with a smoke detector shall send a trouble signal. Trouble signals shall be transmitted to the fire department.

### 3.10. Not Used

#### 4.0 APPLICABLE CRITERIA

Unless a specific document version or date is indicated, use criteria from the most current references as of the date of issue of the contract or task order, including any applicable addenda, unless otherwise stated in the task order. In the event of conflict between References and/or Applicable Military Criteria, apply the most stringent requirement, unless otherwise specifically noted in the contract or task order.

##### 4.1. INDUSTRY CRITERIA

Applicable design and construction criteria references are listed in Table 1 below. This list is not intended to include all criteria that may apply or to restrict design and construction to only those references listed. See also Paragraph 3 for additional facility-specific applicable criteria.

**Table 1: Industry Criteria**

<b>Air Conditioning and Refrigeration Institute (ARI)</b>	
ARI 310/380	Packaged Terminal Air-Conditioners and Heat Pumps
ARI 440	Room Fan-Coil and Unit Ventilator
ANSI/ARI 430-99	Central Station Air Handling Units
ARI 445	Room Air-Induction Units
ARI 880	Air Terminals
<b>Air Movement and Control Association (AMCA)</b>	
AMCA 210	Laboratory Methods of Testing Fans for Rating
<b>American Architectural Manufacturers Association (AAMA)</b>	
AAMA 605	Voluntary Specification Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels
AAMA 607.1	Voluntary Guide Specifications and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum
AAMA 1503	Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors, and Glazed Wall Sections
<b>American Association of State Highway and Transportation Officials (AASHTO)</b>	
	Roadside Design Guide [guardrails, roadside safety devices]
	Standard Specifications for Transportation Materials and Methods of Sampling and Testing [Road Construction Materials]

	Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals
	Guide for Design of Pavement Structures, Volumes 1 and 2 [pavement design guide]
	A Policy of Geometric Design of Highways and Streets
<b>American Bearing Manufacturers Association (AFBMA)</b>	
AFBMA Std. 9	Load Ratings and Fatigue Life for Ball Bearings
AFBMA Std. 11	Load Ratings and Fatigue Life for Roller Bearings
<b>American Boiler Manufacturers Association (ABMA)</b>	
ABMA ISEI	Industry Standards and Engineering Information
<b>American Concrete Institute</b>	
ACI 302.2R	Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials
ACI 318	Building Code Requirements for Structural Concrete
ACI SP-66	ACI Detailing Manual
ACI 530	Building Code Requirements for Masonry Structures
<b>ADA Standards for Accessible Design</b>	
See US Access Board	ADA and ABA Accessibility Guidelines for Buildings and Facilities, Chapters 3-10.
<b>American Institute of Steel Construction (AISC)</b>	
	Manual of Steel Construction – 13 <sup>th</sup> Edition (or latest version)
<b>American Iron and Steel Institute</b>	
AISI S100	North American Specification for the Design of Cold-Formed Steel Structural Members
<b>American National Standards Institute 11 (ANSI)</b>	

ANSI Z21.10.1	Gas Water Heaters Vol. 1, Storage water Heaters with Input Ratings of 75,000 Btu per Hour or less
ANSI Z124.3	American National Standard for Plastic Lavatories
ANSI Z124.6	Plastic Sinks
ANSI Z21.45	Flexible Connectors of Other Than All-Metal Construction for Gas Appliances
ANSI/IEEE C2-2007	National Electrical Safety Code
ANSI/AF&PA NDS-2001	National Design Specification for Wood Construction
<b>American Society of Civil Engineers (ASCE)</b>	
ASCE 7	Minimum Design Loads for Buildings and Other Structures
ASCE 37	Design and Construction of Sanitary and Storm Sewers, Manuals and Reports on Engineering Practice [sanitary sewer and storm drain design criteria]
ASCE/SEI 31-03	Seismic Evaluation of Existing Buildings [Existing Building Alteration/Renovation]
ASCE/SEI 41-06	Seismic Rehabilitation of Existing Buildings [Existing Building Alteration/Renovation]
<b>American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE)</b>	
ASHRAE 90.1	ANSI/ASHRAE/IESNA 90.1, Energy Standard for Buildings Except Low-Rise Residential Buildings
ASHRAE Guideline 0	The Commissioning Process
ASHRAE Guideline 1.1	The HVAC Commissioning Process
ASHRAE Handbooks	Fundamentals, HVAC Applications, Systems and Equipment, Refrigeration (Applicable, except as otherwise specified)
ASHRAE Standard 15	Safety Standard for Refrigeration Systems
ASHRAE Standard 62.1	Ventilation for Acceptable Indoor Air Quality
ASHRAE Standard 55	Thermal Environmental Conditions for Human Occupancy

<b>American Society of Mechanical Engineers International (ASME)</b>	
ASME BPVC SEC VII	Boiler and Pressure Vessel Code: Section VII Recommended Guidelines for the Care of Power Boilers
ASME A17.1	Safety Code for Elevators and Escalators
ASME B 31 (Series)	Piping Codes
<b>American Water Works Association (AWWA)</b>	
	Standards [standards for water line materials and construction]
<b>American Welding Society</b>	
	Welding Handbook
	Welding Codes and Specifications (as applicable to application, see International Building Code for example)
<b>Architectural Woodwork Institute (AWI)</b>	
Version 1.2	AWI Quality Standards 7th Edition
<b>Associated Air Balance Council (AABC)</b>	
AABC MN-1	National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems
	AABC Associated Air Balance Council Testing and Balance Procedures
<b>ASTM International</b>	
ASTM C1060-90(1997)	Standard Practice for Thermographic Inspection of Insulation Installations in Envelope Cavities of Frame Buildings
ASTM E 779 (2003)	Standard Test Method for Determining Air Leakage Rate by Fan Pressurization
ASTM E1827-96(2002)	Standard Test Methods for Determining Airtightness of Buildings Using an Orifice Blower Door
<b>Builders Hardware Manufacturers Association (BHMA)</b>	
ANSI/BHMA	American National Standards for Builders Hardware

<b>Building Industry Consulting Service International</b>	
	Telecommunications Distribution Methods Manual (TDMM)
	Customer-Owned Outside Plant Design Manual (CO-OSP)
<b>Code of Federal Regulations (CFR)</b>	
49 CFR 192	Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards
10 CFR 430	Energy Conservation Program for Consumer Products
<b>Consumer Electronics Association</b>	
CEA 709.1B	Control Network Protocol Specification
CEA 709.3	Free-Topology Twisted-Pair Channel Specification
CEA 852	Tunneling Component Network Protocols Over Internet Protocol Channels
<b>Electronic Industries Association (EIA)</b>	
ANSI/EIA/TIA 568	Structured Cabling Series
ANSI/EIA/TIA 569	Commercial Building Standard for Telecommunications Pathways and Spaces (includes ADDENDA)
ANSI/TIA/EIA-606	Administrative Standard for the Telecommunications Infrastructure of Commercial Buildings
J-STD EIA/TIA 607	Commercial Building Grounding and Bonding Requirements for Telecommunications
<b>Federal Highway Administration (FHWA)</b>	
	Manual on Uniform Traffic Control Devices for Streets and Highways [signage and pavement markings for streets and highways]
FHWA-NHI-01-021	Hydraulic Engineering Circular No. 22, Second Edition, URBAN DRAINAGE DESIGN MANUAL
<b>Illuminating Engineering Society of North America (IESNA)</b>	
IESNA RP-1	Office Lighting

IESNA RP-8	Roadway Lighting
IESNA Lighting Handbook	Reference and Application
<b>Institute of Electrical and Electronics Engineers Inc. (IEEE)</b>	
	Standard for Use of the International System of Units (SI): the Modern Metric System
Standard 1100	Recommended Practice for Powering and Grounding Sensitive Electronic Equipment
<b>International Code Council (ICC)</b>	
IBC	<p>International Building Code</p> <p>Note: All references in the International Building Code to the International Electrical Code shall be considered to be references to NFPA 70.</p> <p>All references in the International Building Code to the International Fuel Gas Code shall be considered to be references to NFPA 54 and NFPA 58.</p> <p>All references in the International Building Code to the International Fire Code and Chapter 9 shall be considered to be references to Unified Facilities Criteria (UFC) 3-600-01.</p>
IMC	<p>International Mechanical Code –</p> <p>Note: For all references to “HEATING AND COOLING LOAD CALCULATIONS”, follow ASHRAE 90.1</p> <p>Note: For all references to “VENTILATION”, follow ASHRAE 62.1</p>
IRC	International Residential Code
IPC	International Plumbing Code
IEC	Energy Conservation Code (IEC) –Applicable only to the extent specifically referenced herein. Refer to Paragraph 5, ENERGY CONSERVATION requirements.
IGC	International Gas Code - not applicable. Follow NFPA 54, National Fuel Gas Code and NFPA 58, Liquefied Petroleum Gas Code.
<b>International Organization for Standardization (ISO)</b>	
ISO 6781:1983	Qualitative detection of thermal irregularities in building envelopes –



	infrared method
<b>LonMark International (LonMark)</b>	
LonMark Interoperability Guidelines	(available at <a href="http://www.lonmark.org">www.lonmark.org</a> ), including: Application Layer Guidelines, Layer 1-6 Guidelines, and External Interface File (XIF) Reference Guide
LonMark Resource Files	(available at <a href="http://www.lonmark.org">www.lonmark.org</a> ), including Standard Network Variable Type (SNVT) definitions
<b>Metal Building Manufacturers Association (MBMA)</b>	
	Metal Building Systems Manual
<b>Midwest Insulation Contractors Association (MICA)</b>	
	National Commercial and Industrial Insulation Standards Manual
<b>National Association of Corrosion Engineers International (NACE)</b>	
NACE RP0169	Control of External Corrosion on Underground or Submerged Metallic Piping Systems
NACE RP0185	Extruded, Polyolefin Resin Coating Systems with Adhesives for Underground or Submerged Pipe
NACE RP0285	Corrosion Control of Underground Storage Tank Systems by Cathodic Protection
NACE RP0286	Electrical Isolation of Cathodically Protected Pipelines
<b>National Electrical Manufacturers Association (NEMA)</b>	
<b>National Environmental Balancing Bureau (NEBB)</b>	
	Procedural Standards Procedural Standards for Testing Adjusting Balancing of Environmental Systems
<b>National Fire Protection Association (NFPA)</b>	
NFPA 10	Standard for Portable Fire Extinguishers
NFPA 13	Installation of Sprinkler Systems
NFPA 13R	Residential Occupancies up to and Including Four Stories in Height Sprinkler Systems

NFPA 14	Standard for the Installation of Standpipes and Hose Systems
NFPA 20	Installation of Centrifugal Fire Pumps
NFPA 24 NFPA 25	Standard for the Installation of Private Fire Service Mains and Their Appurtenances [underground fire protection system design]  Inspection, Testing And Maintenance Of Water-Based Fire Protection Systems
NFPA 30	Flammable and Combustible Liquids Code
NFPA 30A	Motor Fuel Dispensing Facilities and Repair Garages
NFPA 31	Installation of Oil Burning Equipment
NFPA 54	National Fuel Gas Code
NFPA 58	Liquefied Petroleum Gas Code
NFPA 70	National Electrical Code
NFPA 72	National Fire Alarm Code
NFPA 76	Fire Protection of Telecommunications Facilities
NFPA 80	Standard for Fire Doors and Fire Windows
NFPA 90a	Installation of Air Conditioning and Ventilating Systems
NFPA 96	Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations
NFPA 101	Life Safety Code
NFPA 780	Standard for the Installation of Lightning Protection Systems
<b>National Roofing Contractor's Association (NRCA)</b>	
	Roofing and Waterproofing Manual
<b>National Sanitation Foundation, International</b>	
NSF/ANSI Std. 2, 3, 4, 5, 6, 7, 8, 12, 13, 18, 20, 21, 25, 29, 35, 36, 37, 51, 52, 59,	Food Equipment Standards

169	
ANSI/UL Std. 73, 197, 471, 621, 763	Food Equipment Standards
CSA Std. C22.2 No. 109, 120, 195	Food Equipment Standards
<b>Occupational Safety and Health Administration (OSHA)</b>	
Title 29, Part 1926	OSHA Construction Industry Standards, Title 29, Code of Federal Regulations, Part 1926, Safety and Health Regulations for Construction
<b>Plumbing and Drainage Institute (PDI)</b>	
PDI G 101	Testing and Rating Procedure for Grease Interceptors with Appendix of Sizing and Installation Data
PDI WH201	Water Hammer Arrestors
<b>Precast Concrete Institute</b>	
PCI Design Handbook	Precast and Prestressed Concrete
<b>Sheet Metal and Air Conditioning Contractor's National Association (SMACNA)</b>	
SMACNA HVAC Duct Construction Standards	HVAC Duct Construction Standards - Metal and Flexible
SMACNA Architectural Manual	Architectural Sheet Metal Manual
SMACNA HVAC TAB	HVAC Systems - Testing, Adjusting and Balancing
<b>State/Local Regulations</b>	
	State Department of Transportation Standard Specifications for Highway and Bridge Construction
	Sedimentation and Erosion Control Design Requirements
	Environmental Control Requirements
	Storm Water Management Requirements
<b>Steel Door Institute (SDI)</b>	

ANSI A250.8/SDI 100	Standard Steel Doors and Frames
<b>Steel Deck Institute</b>	
	SDI Diaphragm Design Manual
<b>Steel Joist Institute</b>	
	Catalog of Standard Specifications and Load Tables for Steel Joists and Joist Girders
<b>Underwriters Laboratories (UL)</b>	
UL 96A	Installation Requirements for Lightning Protection Systems
UL 300	Standard for Safety for Fire Testing of Fire Extinguishing Systems for Protection of Restaurant Cooking Areas
<b>UNITED STATES ACCESS BOARD: U.S. ARCHITECTURAL AND TRANSPORTATION BARRIERS COMPLIANCE BOARD</b>	
ADA and ABA Accessibility Guidelines for Buildings and Facilities	<p>ABA Accessibility Standard for DoD Facilities</p> <p>Derived from the ADA and ABA Accessibility Guidelines: Specifically includes: ABA Chapters 1 and 2 and Chapters 3 through 10.</p> <p>Use this reference in lieu of IBC Chapter 11.</p> <p>Excluded are:</p> <p>(a) Facilities, or portions of facilities, on a military installation that are designed and constructed for use exclusively by able-bodied military personnel (See Paragraph 3 for any reference to this exclusion).</p> <p>(b) Reserve and National Guard facilities, or portions of such facilities, owned by or under the control of the Department of Defense, that are designed and constructed for use exclusively by able-bodied military personnel. (See paragraph 3 for any reference to this exclusion).</p>
<b>U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES</b>	
	FDA National Food Code
<b>U.S. GREEN BUILDING COUNCIL (USGBC)</b>	
LEED-NC	Green Building Rating System for New Construction & Major Renovations
	Application Guide for Multiple Buildings and On-Campus Building Projects

## 4.2. MILITARY CRITERIA

The project shall conform to the following criteria. Certain design impacts and features due to these criteria are noted for the benefit of the offeror. However, all requirements of the referenced criteria will be applicable, whether noted or not, unless otherwise specified herein.

4.2.1. Energy Policy Act of 2005 (Public Law 109-58) (applies only to the extent specifically implemented in the contract, which may or may not directly cite or reference EPACT)

4.2.2. Executive Order 12770: Metric Usage In Federal Government

(a) Metric design and construction is required except when it increases construction cost. Offeror to determine most cost efficient system of measurement to be used for the project.

4.2.3. TB MED 530: Occupational and Environmental Health Food Sanitation

4.2.4. Unified Facilities Criteria (UFC) 3-410-01FA: Heating, Ventilating, and Air Conditioning - applicable only to the extent specified in paragraph 5, herein.

4.2.5. Deleted.

4.2.6. UFC 3-600-01 Design: Fire Protection Engineering for Facilities. Use the latest edition of the IBC in coordination with this UFC. Use Chapters 3, 6, 7, 33 and UFC 3-600-01. If any conflict occurs between these Chapters and UFC 3-600-01, the requirements of UFC 3-600-01 take precedence. Use UFC 3-600-01 in lieu of IBC Chapters 4, 8,9,10.

4.2.7. UFC 4-010-01 DoD Minimum Antiterrorism Standards for Buildings

4.2.8. UFC 4-023-03 Design of Buildings to Resist Progressive Collapse (Use most recent version, regardless of references thereto in other publications)

(a) Note the option to use tie force method or alternate path design for Occupancy Category II.

4.2.9. UFC 4-021-01 Design and O&M: Mass Notification Systems

4.2.10. Technical Criteria for Installation Information Infrastructure Architecture (I3A)

(a) Email: [DetrickISECI3Aguide@conus.army.mil](mailto:DetrickISECI3Aguide@conus.army.mil)

4.2.11. U.S. Army Information Systems Engineering Command (USAISEC) TG for the Integration of SECRET Internet Protocol (IP) Router Network (SIPRNET). See Paragraph 3 for applicability to specific facility type. May not apply to every facility. This is mandatory criteria for those facilities with SIPRNET.

## 5.0 GENERAL TECHNICAL REQUIREMENTS

This paragraph contains general technical requirements. See also Paragraph 3 for facility-specific technical requirements. Residential or similar grade finishes and materials are not acceptable for inclusion in these buildings, unless otherwise specifically allowed.

### 5.1. SITE PLANNING AND DESIGN

5.1.1. STANDARDS AND CODES: The site planning and design shall conform to APPLICABLE CRITERIA and to paragraph 6, PROJECT SPECIFIC REQUIREMENTS.

5.1.2. SITE PLANNING OBJECTIVES: Group buildings in configurations that create a sense of community and promote pedestrian use. See paragraph 3 for additional site planning requirements relating to building functions.

5.1.2.1. Provide enclosures and or visual screening devices for Outdoor Utility such as dumpsters, emergency generators, transformers, heating, ventilation, and air conditioning units from streetscape and courtyard views to limit visual impact. Enclosures shall be compatible with the building they serve and accessible by vehicle. The location of dumpsters can have a significant visual impact and should be addressed as part of an overall building design and incorporated in site planning.

5.1.2.2. Where included in the project, dumpster pads shall be concrete (minimum of 8 inches thick on 4 inch base course, unless site conditions dictate more conservative requirements) and directly accessible by way of a paved service drive or parking lot with adequate overhead clearance for collection vehicles. Provide space at dumpster areas for recycling receptacles. Coordinate with Installation on recycling receptacle types, sizes and access requirements and provide space at dumpster areas to accommodate them.

5.1.2.3. Vehicular Circulation. Apply design vehicle templates provided by the American Association of State Highway and Transportation Officials (AASHTO) to the site design. The passenger car class includes passenger cars and light trucks, such as vans and pick-ups. The passenger car template is equivalent to the non-organizational – privately owned vehicle (POV). The truck class template includes single-unit trucks, recreation vehicles, buses, truck tractor-semi-trailer combinations, and trucks or truck tractors with semi-trailers in combination with full trailers. Provide vehicle clearances required to meet traffic safety for emergency vehicles, service vehicles, and moving vans. Provide required traffic control signage Site entrances and site drive aisles shall maximize spacing between drives, incorporate right-angle turns, and limit points of conflict between traffic. Design Services Drives to restrict access to unauthorized vehicles by removable bollards, gates, or other barriers to meet Anti-Terrorism/Force Protection (ATFP) requirements. Orient service drives to building entrances other than the primary pedestrian entry at the front of the building.

5.1.2.4. Provide Emergency Vehicle Access around the facility and shall be in accordance with AT/FP requirements. Maintain a 33-foot clear zone buffer for emergency vehicles, designed to prevent other vehicles from entering the AT/FP standoff to the building.

5.1.2.5. Clear and grub all trees and vegetation necessary for construction; but, save as many trees as possible. Protect trees to be saved during the construction process from equipment.

5.1.2.6. Stormwater Management. Employ design and construction strategies (Best Management Practices) that reduce stormwater runoff, reduce discharges of polluted water offsite and maintain or restore predevelopment hydrology with respect to temperature, rate, volume and duration of flow to the maximum extent practicable. See paragraph 6, PROJECT SPECIFIC requirements for additional information.

5.1.3. EXTERIOR SIGNAGE: Provide exterior signage in accordance with Appendix H, Exterior Signage. Provide exterior NO SMOKING signage that conveys building and grounds smoking policy.

5.1.4. EXISTING UTILITIES: Base utilities maps and capacities for this site are included as part of this RFP. See paragraph 6 for more detailed information.

### 5.2. SITE ENGINEERING

5.2.1. STANDARDS AND CODES: The site engineering shall conform to APPLICABLE CRITERIA.

5.2.2. SOILS:

5.2.2.1. A report has been prepared to characterize the subsurface conditions at the project site and is **appended to these specifications**. The report provides a general overview of the soil and geologic conditions with detailed descriptions at discrete boring locations. The Contractor's team shall include a licensed geotechnical engineer to interpret the report and develop earthwork and foundation recommendations and design parameters in which to base the contractor's design. If any additional subsurface investigation or laboratory analysis is required to better characterize the site or develop the final design, the Contractor shall perform it under the direction of a licensed geotechnical engineer. There will be no separate payment for the cost of additional tests. If differences between the Contractor's additional subsurface investigation and the government provided soils report or the reasonably expected conditions require material revisions in the design, an equitable adjustment may be made, in accordance with the provisions of the Differing Site Conditions clause. The basis for the adjustment would be the design and construction appropriate for the conditions described in the Government furnished report or the reasonably expected conditions, in comparison with any changes required by material differences in the actual conditions encountered, in accordance with the terms of contract clause Differing Site Conditions.

5.2.2.2. The contractor's licensed geotechnical engineer shall prepare a final geotechnical evaluation report, to be submitted along with the first foundation design submittal, as described in Section 01 33 16, *Design After Award*.

5.2.3. VEHICLE PAVEMENTS: (as applicable to the project)

5.2.3.1. Design procedures and materials shall conform to one of the following: 1) the USACE Pavement Transportation Computer Assisted Structural Engineering (PCASE) program, 2) American Association of State Highway and Transportation Officials (AASHTO) or, 3) the applicable state Department of Transportation standards in which the project is located. See paragraph 5.2.2.2 and Section 01 33 16 for required information for the Contractor's geotechnical evaluation report. The minimum flexible pavement section shall consist of 2 inches of asphalt and 6 inches of base or as required by the pavement design, whichever is greater, unless specifically identified by the Government to be a gravel road. Design roads and parking areas for a life expectancy of 25 years with normal maintenance. Parking area for tactical vehicles (as applicable to the project) shall be Portland Cement Concrete (PCC) rigid pavement design. For concrete pavements, submit joint layout plan for review and concurrence. Design pavements for military tracked vehicles (as applicable to the project) IAW USACE PCASE. Traffic estimates for each roadway area will be as shown on the drawings or listed in Section 01 10 00 Paragraph 6.4.4. Pavement markings and traffic signage shall comply with the Installation requirements and with the Manual on Uniform Traffic Control Devices.

5.2.3.2. Parking Requirements.

- (a) All handicap POV parking lots (where applicable in the facility specific requirements) shall meet the ADA and ABA Accessibility Guidelines for accessible parking spaces.
- (b) Design POV parking spaces for the type of vehicles anticipated, but shall be a minimum of 9 ft by 18 ft for POVs, except for two wheel vehicles.

5.2.3.3. Sidewalks. Design the network of walks throughout the complex (where applicable) to facilitate pedestrian traffic among facilities, and minimize the need to use vehicles. Incorporate sidewalks to enhance the appearance of the site development, while creating a sense of entry at the primary patron entrances to the buildings. Minimum sidewalk requirements are in Paragraph 3, where applicable.

5.2.4. CATHODIC PROTECTION: Provide cathodic protection systems for all underground metallic systems and metallic fittings/portions of non-metallic, underground systems, both inside and outside the building 5 foot line that are subject to corrosion. Coordinate final solutions with the installation to insure an approach that is consistent with installation cathodic protection programs.

5.2.5. UTILITIES: See paragraph 6.4.6 for specific information on ownership of utilities and utility requirements. Meter all utilities (gas, water, and electric, as applicable) to each facility. For Government owned utilities, install meters that are wireless data transmission capable as well as have a continuous manual reading option. All meters will be capable of at least hourly data logging and transmission and provide consumption data for gas, water, and electricity. Gas and electric meters will also provide demand readings based on consumption over a maximum of

any 15 minute period. Configure all meters to transmit at least daily even if no receiver for the data is currently available at the time of project acceptance. For privatized utilities, coordinate with the privatization utility(ies) for the proper meter base and meter installation.

5.2.6. PERMITS: The CONTRACTOR shall be responsible for obtaining all permits (local, state and federal) required for design and construction of all site features and utilities.

5.2.7. IRRIGATION. Landscape irrigation systems, if provided, shall comply with the following:

5.2.7.1. Irrigation Potable Water Use Reduction. Reduce irrigation potable water use 50 percent using LEED credit WE1.1 baseline, except where precluded by other project requirements.

5.2.8. EPA WaterSense Products and Contractors. Except where precluded by other project requirements, use EPA WaterSense labeled products and irrigation contractors that are certified through a WaterSense labeled program where available.

### 5.3. ARCHITECTURE AND INTERIOR DESIGN:

This element will be evaluated per APPLICABLE CRITERIA under the quality focus.

5.3.1. STANDARDS AND CODES: The architecture and interior design shall conform to APPLICABLE CRITERIA.

5.3.2. GENERAL: Overall architectural goal is to provide a functional, quality, visually appealing facility that is a source of pride for the installation and delivered within the available budget and schedule.

5.3.3. COMPUTATION OF AREAS: See APPENDIX Q for how to compute gross and net areas of the facility(ies).

5.3.4. BUILDING EXTERIOR: Design buildings to enhance or compliment the visual environment of the Installation. Where appropriate, reflect a human scale to the facility. Building entrance should be architecturally defined and easily seen. When practical, exterior materials, roof forms, and detailing shall be compatible with the surrounding development and adjacent buildings on the Installation and follow locally established architectural themes. Use durable materials that are easy to maintain. Exterior colors shall conform to the Installation requirements. See paragraph 6.

5.3.4.1. Building Numbers: Each building shall have exterior signage permanently attached on two faces of the building indicating the assigned building number or address. Building number signage details and locations shall conform to Appendix H, Exterior Signage.

### 5.3.5. BUILDING INTERIOR

5.3.5.1. Space Configuration: Arrange spaces in an efficient and functional manner in accordance with area adjacency matrices.

5.3.5.2. Surfaces: Appearance retention is the top priority for building and furniture related finishes. Provide low maintenance, easily cleaned room finishes that are commercially standard for the facility occupancy specified, unless noted otherwise.

5.3.5.3. Color: The color, texture and pattern selections for the finishes of the building shall provide an aesthetically pleasing, comfortable, easily maintainable and functional environment for the occupants. Coordination of the building colors and finishes is necessary for a cohesive design. Color selections shall be appropriate for the building type. The use of color, texture and pattern shall be used to path or way find through the building. Trendy colors that will become dated shall be limited to non-permanent finishes such as carpet and paint. Finishes should be selected with regards to aesthetics, maintenance, durability, life safety and image. Limit the number of similar colors for each material. Color of Ceramic and porcelain tile grout shall be medium range color to help hide soiling. Plastic laminate and solid surface materials shall have patterns that are mottled, flecked or speckled. Finish colors of fire extinguisher cabinets, receptacle bodies and plates, fire alarms / warning lights, emergency lighting, and other miscellaneous items shall be coordinated with the building interior. Color of equipment items on ceilings (speakers, smoke detectors, grills, etc.) shall match the ceiling color.



5.3.5.4. Circulation: Circulation schemes must support easy way finding within the building.

5.3.5.5. Signage: Provide interior signage for overall way finding and life safety requirements. A comprehensive interior plan shall be from one manufacturer. Include the following sign types: (1) Lobby Directory, (2) Directional Signs; (3) Room Identification Signs; (4) Building Service Signs; (5) Regulatory Signs; (6) Official and Unofficial Signs (7) Visual Communication Boards (8) NO SMOKING signage that conveys building smoking policy. Use of emblems or logos may also be incorporated into the signage plan.

5.3.5.6. Window Treatment: Interior window treatments with adjustable control shall be provided in all exterior window locations for control of day light coming in windows or privacy at night. Uniformity of treatment color and material shall be maintained to the maximum extent possible within a building.

#### 5.3.6. COMPREHENSIVE INTERIOR DESIGN

5.3.6.1. Comprehensive Interior Design includes the integration of a Structural Interior Design (SID) and a Furniture, Fixtures and Equipment (FF&E) design and package. SID requires the design, selection and coordination of interior finish materials that are integral to or attached to the building structure. Completion of a SID involves the selection and specification of applied finishes for the building's interior features including, but not limited to, walls, floors, ceilings, trims, doors, windows, window treatments, built-in furnishings and installed equipment, lighting, and signage. The SID package includes finish schedules, finish samples and any supporting interior elevations, details or plans necessary to communicate the building finish design and build out. The SID also provides basic space planning for the anticipated FF&E requirements in conjunction with the functional layout of the building and design issues such as life safety, privacy, acoustics, lighting, ventilation, and accessibility. See Section 01 33 16 for SID design procedures.

The FF&E design and package includes the design, selection, color coordination and of the required furnishing items necessary to meet the functional, operational, sustainability, and aesthetic needs of the facility coordinated with the interior finish materials in the SID. The FF&E package includes the specification, procurement documentation, placement plans, ordering and finish information on all freestanding furnishings and accessories, and a cost estimate. Coordinate the selection of furniture style, function and configuration with the defined requirements. Examples of FF&E items include, but are not limited to workstations, seating, files, tables, beds, wardrobes, draperies and accessories as well as marker boards, tack boards, and presentation screens. Criteria for furniture selection include function and ergonomics, maintenance, durability, sustainability, comfort and cost. See Section 01 33 16 for FFE design procedures.

#### 5.4. STRUCTURAL DESIGN

5.4.1. STANDARDS AND CODES: The structural design shall conform to APPLICABLE CRITERIA.

5.4.2. GENERAL: The structural system needs to be compatible with the intended functions and components that allows for future flexibility and reconfigurations of the interior space. Select an economical structural system based upon facility size, projected load requirements and local availability of materials and labor. Base the structural design on accurate, site specific geotechnical information and anticipated loads for the building types and geographical location. When modular units or other pre-fabricated construction is used or combined with stick-built construction, fully coordinate and integrate the overall structural design between the two different or interfacing construction types. If the state that the project is located in requires separate, specific licensing for structural engineers (for instance, such as in Florida, California and others), then the structural engineer designer of record must be registered in that state.

5.4.3. LOADS: See paragraph 3 for facility specific (if applicable) and paragraph 6 for site and project specific structural loading criteria. Unless otherwise specified in paragraph 6, use Exposure Category C for wind. If not specified, use Category C unless the Designer of Record can satisfactorily justify another Exposure Category in its design analysis based on the facility Master Plan. Submit such exceptions for approval as early as possible and prior to the Interim Design Submittal in Section "Design After Award".

5.4.4. TERMITE TREATMENT: (Except Alaska) Provide termite prevention treatment in accordance with Installation and local building code requirements, using licensed chemicals and licensed applicator firm.

#### 5.5. THERMAL PERFORMANCE

5.5.1. STANDARDS AND CODES: Building construction and thermal insulation for mechanical systems shall conform to APPLICABLE CRITERIA.

5.5.2. BUILDING ENVELOPE SEALING PERFORMANCE REQUIREMENT. Design and construct the building envelope for office buildings, office portions of mixed office and open space (e.g., company operations facilities), dining, barracks and instructional/training facilities with a continuous air barrier to control air leakage into, or out of, the conditioned space. Clearly identify all air barrier components of each envelope assembly on construction documents and detail the joints, interconnections and penetrations of the air barrier components. Clearly identify the boundary limits of the building air barriers, and of the zone or zones to be tested for building air tightness on the drawings.

5.5.2.1. Trace a continuous plane of air-tightness throughout the building envelope and make flexible and seal all moving joints.

5.5.2.2. The air barrier material(s) must have an air permeance not to exceed 0.004 cfm / sf at 0.3" wg (0.02 L/s.m2 @ 75 Pa) when tested in accordance with ASTM E 2178

5.5.2.3. Join and seal the air barrier material of each assembly in a flexible manner to the air barrier material of adjacent assemblies, allowing for the relative movement of these assemblies and components.

5.5.2.4. Support the air barrier so as to withstand the maximum positive and negative air pressure to be placed on the building without displacement, or damage, and transfer the load to the structure.

5.5.2.5. Seal all penetrations of the air barrier. If any unavoidable penetrations of the air barrier by electrical boxes, plumbing fixture boxes, and other assemblies are not airtight, make them airtight by sealing the assembly and the interface between the assembly and the air barrier or by extending the air barrier over the assembly.

5.5.2.6. The air barrier must be durable to last the anticipated service life of the assembly.

5.5.2.7. Do not install lighting fixtures with ventilation holes through the air barrier

5.5.2.8. Provide a motorized damper in the closed position and connected to the fire alarm system to open on call and fail in the open position for any fixed open louvers such as at elevator shafts.

5.5.2.9. Damper and control to close all ventilation or make-up air intakes and exhausts, atrium smoke exhausts and intakes, etc when leakage can occur during inactive periods.

5.5.2.10. Compartmentalize garages under buildings by providing air-tight vestibules at building access points.

5.5.2.11. Compartmentalize spaces under negative pressure such as boiler rooms and provide make-up air for combustion.

5.5.2.12. Performance Criteria and Substantiation: Submit the qualifications and experience of the testing entity for approval. Demonstrate performance of the continuous air barrier for the opaque building envelope by the following tests:

(a) Test the completed building and demonstrate that the air leakage rate of the building envelope does not exceed 0.25cfm/ft2 at a pressure differential of 0.3" w.g.(75 Pa) in accordance with ASTM's E 779 (2003) or E-1827-96 (2002). Accomplish tests using either pressurization or depressurization or both. Divide the volume of air leakage in cfm @ 0.3" w.g. (L/s @ 75 Pa) by the area of the pressure boundary of the building, including roof or ceiling, walls and floor to produce the air leakage rate in cfm/ft2 @ 0.3" w.g. (L/s.m2 @ 75 Pa). Do not test the building until verifying that the continuous air barrier is in place and installed without failures in accordance with installation instructions so that repairs to the continuous air barrier, if needed to comply with the required air leakage rate, can be done in a timely manner.

(b) Test the completed building using Infrared Thermography testing. Use infrared cameras with a resolution of 0.1deg C or better. Perform testing on the building envelope in accordance with ISO 6781:1983 and ASTM C1060-90(1997). Determine air leakage pathways using ASTM E 1186-03 Standard Practices for Air Leakage Site

Detection in Building Envelopes and Air Barrier Systems, and perform corrective work as necessary to achieve the whole building air leakage rate specified in (a) above.

(c) Notify the Government at least three working days prior to the tests to provide the Government the opportunity to witness the tests. Provide the Government written test results confirming the results of all tests.

## 5.6. PLUMBING

5.6.1. STANDARDS AND CODES: The plumbing system shall conform to APPLICABLE CRITERIA.

5.6.2. PRECAUTIONS FOR EXPANSIVE SOILS: Where expansive soils are present, the design for underslab piping systems and underground piping serving chillers, cooling towers, etc, shall include features to control forces resulting from soil heave. Some possible solutions include, but are not necessarily limited to, features such as flexible expansion joints, slip joints, horizontal offsets with ball joints, or multiple bell and spigot gasketed fittings. For structurally supported slabs, piping should be suspended from the structure with adequate space provided below the pipe for the anticipated soil movement.

5.6.3. HOT WATER SYSTEMS: For Hot Water heating and supply, provide a minimum temp of 140 Deg F in the storage tank and a maximum of 110 Deg F at the fixture, unless specific appliances or equipment specifically require higher temperature water supply.

5.6.4. SIZING HOT WATER SYSTEMS: Unless otherwise specified or directed in paragraph 3, design in accordance with ASHRAE Handbook Series (appropriate Chapters), ASHRAE Standard 90.1, and the energy conservation requirements of the contract. Size and place equipment so that it is easily accessible and removable for repair or replacement.

5.6.5. JANITOR CLOSETS: In janitor spaces/room/closets, provide at minimum, a service sink with heavy duty shelf and wall hung mop and broom rack(s).

5.6.6. FLOOR DRAINS: As a minimum, provide floor drains in mechanical rooms and areas, janitor spaces/rooms/closets and any other area that requires drainage from fixtures or equipment, drain downs, condensate, as necessary.

5.6.7. URINALS: Urinals shall be vitreous china, wall-mounted, wall outlet, non-water using, with integral drain line connection, and with sealed replaceable cartridge or integral liquid seal trap. Either type shall use a biodegradable liquid to provide the seal and maintain a sanitary and odor-free environment. Install, test and maintain in accordance with manufacturer's recommendations. Slope the sanitary sewer branch line for non-water use urinals a minimum of 1/4 inch per foot. Do not use copper tube or pipe for drain lines that connect to the urinal. Manufacturer shall provide an operating manual and on-site training to installation operations personnel for the proper care and maintenance of the urinal. For complexes, non-water using urinals are not required for barracks type spaces.

5.6.8. BUILDING WATER USE REDUCTION. Reduce building potable water use in each building 20 percent using IPC fixture performance requirements baseline except where precluded by other project requirements.

5.6.9. Do not use engineered vent or Sovent® type drainage systems.

5.6.10. Where the seasonal design temperature of the cold water entering a building is below the seasonal design dew point of the indoor ambient air, and where condensate drip will cause damage or create a hazard, insulate plumbing piping with a vapor barrier type of insulation to prevent condensation. Do not locate water or drainage piping over electrical wiring or equipment unless adequate protection against water (including condensation) damage is provided. Insulation alone is not adequate protection against condensation. Follow ASHRAE Fundamentals Chapter 23, Insulation for Mechanical Systems, IMC paragraph 1107 and International Energy Conservation Code for pipe insulation requirements.

## 5.7. ELECTRICAL AND TELECOMMUNICATIONS SYSTEMS

5.7.1. STANDARDS AND CODES: The electrical systems for all facilities shall conform to APPLICABLE CRITERIA.

5.7.2. MATERIALS AND EQUIPMENT: Materials, equipment and devices shall, as a minimum, meet the requirements of Underwriters Laboratories (UL) where UL standards are established for those items. Wiring for branch circuits shall be copper. Motors larger than one-half horsepower shall be three phase. All electrical systems shall be pre-wired and fully operational unless otherwise indicated. Wall mounted electrical devices (power receptacles, communication outlets and CATV outlets) shall have matching colors, mounting heights and faceplates.

5.7.3. POWER SERVICE: Primary service from the base electrical distribution system to the pad-mounted transformer and secondary service from the transformer to the building service electrical equipment room shall be underground. See paragraph 6 for additional site electrical requirements.

5.7.3.1. Spare Capacity: Provide 10% space for future circuit breakers in all panelboards serving residential areas of buildings and 15% spaces in all other panelboards.

5.7.4. TELECOMMUNICATION SERVICE: The project's facilities must connect to the Installation telecommunications (voice and data) system through the outside plant (OSP) telecommunications underground infrastructure cabling system per the I3A Criteria. Connect to the OSP cabling system from each facility main cross connect located in the telecommunications room.

5.7.5. LIGHTING: Comply with the recommendations of the Illumination Engineering Society of North America (IESNA), the National Energy Policy Act and Energy Star requirements for lighting products..

5.7.5.1. Interior Lighting:

(a) **Reflective Surfaces:** Coordinate interior architectural space surfaces and colors with the lighting systems to provide the most energy-efficient workable combinations.

(b) **High Efficiency Fluorescent Lighting:** Utilize **NEMA premium electronic ballasts** and energy efficient fluorescent lamps with a Correlated Color Temperature (CCT) of 4100K. Linear fluorescent and compact fluorescent fixtures shall have a Color Rendering Index of (CRI) of 87 or higher. Fluorescent lamps shall be the low mercury type qualifying as non-hazardous waste upon disposal. Do not use surface mounted fixtures on acoustical tile ceilings. Provide an un-switched fixture with emergency ballast shall be provided at each entrance to the building.

(c) **Solid State Lighting:** **Fixtures shall provide lighting** with a minimum Correlated Color Temperature (CCT) of 4100K and shall have a Color Rendering Index of (CRI) of 75 or higher. **Verify performance of the light producing solid state components by a test report in compliance with the requirements of IESNA LM 80. Verify performance of the solid state light fixtures by a test report in compliance with the requirements of IESNA LM 79. Provide lab results by a NVLAP certified laboratory. The light producing solid state components and drivers shall have a life expectancy of 50,000 operating hours while maintaining at least 70% of original illumination level. Provide a complete five year warranty for fixtures.**

(d) **Metal Halide Lighting (where applicable):** Metal Halide lamp fixtures in the range of 150-500 Watts shall be pulse start type and have a minimum efficiency rating of 88%.

(e) **Lighting Controls:** **ANSI/ASHRAE/IESNA 90.1 has specific lighting controls requirements.** Provide a high level of lighting system control by individual occupants or by specific groups in multi-occupant spaces (classrooms, conference rooms) to promote the productivity, comfort and well being of the building occupants. **In office spaces, the preferred lighting should be a 30 FC ambient lighting level with occupancy sensor controlled task lighting in the work spaces to provide a composite lighting level of 50 FC on the working surfaces.** Consider incorporating daylighting techniques for the benefit of reducing lighting energy requirements while improving the quality of the indoor spaces. If daylight strategies are used, additional coordination is required with the architect and mechanical engineer. Additionally, incorporate electric lighting controls to take advantage of the potential energy savings.

(f) **Exterior Lighting:** See paragraph 6.9 for site specific information, if any, on exterior lighting systems. **Minimize light pollution and light trespass by not over lighting and use cutoff type exterior luminaries.**

5.7.6. TELECOMMUNICATION SYSTEM: All building telecommunications cabling systems (BCS) and OSP telecommunications cabling system shall conform to APPLICABLE CRITERIA to include I3A Technical Criteria. An acceptable BCS encompasses, but is not limited to, copper and fiber optic (FO) entrance cable, termination equipment, copper and fiber backbone cable, copper and fiber horizontal distribution cable, workstation outlets, racks, cable management, patch panels, cable tray, cable ladder, conduits, grounding, and labeling.. Items included

under OSP infrastructure encompass, but are not limited to, manhole and duct infrastructure, copper cable, fiber optic cable, cross connects, terminations, cable vaults, and copper and FO entrance cable.

5.7.6.1. Design, install, label and test all telecommunications systems in accordance with the I3A Criteria and ANSI/TIA/EIA 568, 569, and 606 standards. A Building Industry Consulting Services International (BICSI) Registered Communications Distribution Designer (RCDD) with at least 2 yrs related experience shall develop and stamp telecommunications design, and prepare the test plan. See paragraph 5.8.2.5 for design of environmental systems for Telecommunications Rooms.

5.7.6.2. The installers assigned to the installation of the telecommunications system or any of its components shall be regularly and professionally engaged in the business of the application, installation and testing of the specified telecommunications systems and equipment. Key personnel; i.e., supervisors and lead installers assigned to the installation of this system or any of its components shall be BICSI Registered Cabling Installers, Technician Level. Submit documentation of current BICSI certification for each of the key personnel. In lieu of BICSI certification, supervisors and installers shall have a minimum of 5 years experience in the installation of the specified copper and fiber optic cable and components. They shall have factory or factory approved certification from each equipment manufacturer indicating that they are qualified to install and test the provided products.

5.7.6.3. Perform a comprehensive end to end test of all circuits to include all copper and fiber optic cables upon completion of the BCS and prior to acceptance of the facility. The BCS circuits include but are not limited to all copper and fiber optic(FO) entrance cables, termination equipment, copper and fiber backbone cable, copper and fiber horizontal distribution cable, and workstation outlets. Test in accordance with ANSI/EIA/TIA 568 standards. Use test instrumentation that meets or exceeds the standard. Submit the official test report to include test procedures, parameters tested, values, discrepancies and corrective actions in electronic format. Test and accomplish all necessary corrective actions to ensure that the government receives a fully operational, standards based, code compliant telecommunications system.

5.7.7. LIGHTNING PROTECTION SYSTEM: Provide a lightning protection system where recommended by the Lightning Risk Assessment of NFPA 780, Annex L.

## 5.8. HEATING, VENTILATING, AND AIR CONDITIONING

5.8.1. STANDARDS AND CODES: The HVAC system shall conform to APPLICABLE CRITERIA.

### 5.8.2. DESIGN CONDITIONS.

5.8.2.1. Outdoor and indoor design conditions shall be in accordance with UFC 3-410-01FA. Outdoor air and exhaust ventilation requirements for indoor air quality shall be in accordance with ASHRAE 62.1.

5.8.2.2. Design systems in geographical areas that meet the definition for high humidity in UFC 3-410-01FA in accordance with the special criteria for humid areas therein.

5.8.2.3. Cooling equipment may be oversized by up to 15 percent to account for recovery from night setback. Heating equipment may be oversized by up to 30 percent to account for recovery from night setback. Design single zone systems and multi-zone systems to maintain an indoor design condition of 50% relative humidity for cooling only. For heating only where the indoor relative humidity is expected to fall below 20% for extended periods, add humidification to increase the indoor relative humidity to 30%. Provide ventilation air from a separate dedicated air handling unit (DOAU) for facilities using multiple single zone fan-coil type HVAC systems. Do not condition outside air through fan coil units. Avoid the use of direct expansion cooling coils in air handling units with constant running fans that handle outside air.

5.8.2.4. Locate all equipment so that service, adjustment and replacement of controls or internal components are readily accessible for easy maintenance.

5.8.2.5. Environmental Requirements for Telecommunications Rooms,(including SIPRNET ROOMS, where applicable for specific facility type). Comply with ANSI/EIA/TIA 569 and the I3A.

5.8.2.6. Fire dampers: dynamic type with a dynamic rating suitable for the maximum air velocity and pressure differential to which the damper is subjected. Test each fire damper with the air handling and distribution system running.

5.8.3. BUILDING AUTOMATION SYSTEM. Provide a Building Automation System consisting of a building control network , and integrate the building control network into the UMCS as specified.

The building control network shall be a single complete non-proprietary Direct Digital Control (DDC) system for control of the heating, ventilating and air conditioning (HVAC) systems as specified herein. The building control network shall be an Open implementation of LONWORKS® technology using ANSI/EIA 709.1B as the only communications protocol and use only LonMark Standard Network Variable Types (SNVTs), as defined in the LonMark® Resource Files, for communication between DDC Hardware devices to allow multi-vendor interoperability.

5.8.3.1. The building automation system shall be open in that it is designed and installed such that the Government or its agents are able to perform repair, replacement, upgrades, and expansions of the system without further dependence on the original Contractor. This includes, but is not limited to the following:

- (a) Install hardware such that individual control equipment can be replaced by similar control equipment from other equipment manufacturers with no loss of system functionality.
- (b) Necessary documentation (including rights to documentation and data), configuration information, configuration tools, programs, drivers, and other software shall be licensed to and otherwise remain with the Government such that the Government or its agents are able to perform repair, replacement, upgrades, and expansions of the system without subsequent or future dependence on the Contractor.

5.8.3.2. All DDC Hardware shall:

- (a) Be connected to a TP/FT-10 ANSI/EIA 709.3 control network.
- (b) Communicate over the control network via ANSI/EIA 709.1B exclusively.
- (c) Communicate with other DDC hardware using only SNVTs
- (d) Conform to the LonMark® Interoperability Guidelines.
- (e) Be locally powered; link power (over the control network) is not acceptable.
- (f) Be fully configurable via standard or user-defined configuration parameter types (SCPT or UCPT), standard network variable type (SNVT) network configuration inputs (*nci*), or hardware settings on the controller itself to support the application. All settings and parameters used by the application shall be configurable via standard or user-defined configuration parameter types (SCPT or UCPT), standard network variable type (SNVT) network configuration inputs (*nci*), or hardware settings on the controller itself
- (g) Provide input and output SNVTs required to support monitoring and control (including but not limited to scheduling, alarming, trending and overrides) of the application. Required SNVTs include but are not limited to: SNVT outputs for all hardware I/O, SNVT outputs for all setpoints and SNVT inputs for override of setpoints.
- (h) To the greatest extent practical, not rely on the control network to perform the application..

5.8.3.3. Controllers shall be Application Specific Controllers whenever an ASC suitable for the application exists. When an ASC suitable for the application does not exist use programmable controllers or multiple application specific controllers.

5.8.3.4. Application Specific Controllers shall be LonMark Certified whenever a LonMark Certified ASC suitable for the application exists. For example, VAV controllers must be LonMark certified.

5.8.3.5. Application Specific Controllers (ASCs) shall be configurable via an LNS plug-in whenever t an ASC with an LNS plug-in suitable for the application exists.

5.8.3.6. Each scheduled system shall accept a network variable of type SNVT\_occupancy and shall use this network variable to determine the occupancy mode. If the system has not received a value to this network variable for more than 60 minutes it shall default to a configured occupancy schedule.

5.8.3.7. Gateways may be used provided that each gateway communicates with and performs protocol translation for control hardware controlling one and only one package unit.

5.8.3.8. Not Used

5.8.3.9. Perform all necessary actions needed to fully integrate the building control system. These actions include but are not limited to:

- Configure M&C Software functionality including: graphical pages for System Graphic Displays including overrides, alarm handling, scheduling, trends for critical values needing long-term or permanent monitoring via trends, and demand limiting.
- Install IP routers or ANSI/CEA-852 routers as needed to connect the building control network to the UMCS IP network. Routers shall be capable of configuration via DHCP and use of an ANSI/CEA-852 configuration server but shall not rely on these services for configuration. All communication between the UMCS and building networks shall be via the ANSI/CEA-709.1B protocol over the IP network in accordance with ANSI/CEA-852.

5.8.3.10. Provide the following to the Government for review prior to acceptance of the system:

- The latest version of all software and user manuals required to program, configure and operate the system.
- Points Schedule drawing that shows every DDC Hardware device. The Points Schedule shall contain the following information as a minimum:
  - Device address and NodeID.
  - Input and Output SNVTs including SNVT Name, Type and Description.
  - Hardware I/O, including Type (AI, AO, BI, BO) and Description.
  - Alarm information including alarm limits and SNVT information.
  - Supervisory control information including SNVTs for trending and overrides.
  - Configuration parameters (for devices without LNS plug-ins) Example Points Schedules are available at <https://eko.usace.army.mil/fa/besc/>
- Riser diagram of the network showing all network cabling and hardware. Label hardware with ANSI.CEA-709.1 addresses, IP addresses, and network names.
- Control System Schematic diagram and Sequence of Operation for each HVAC system.
- Operation and Maintenance Instructions including procedures for system start-up, operation and shut-down, a routine maintenance checklist, and a qualified service organization list.
- LONWORKS® Network Services (LNS®) database for the completed system.
- Quality Control (QC) checklist (below) completed by the Contractor's Chief Quality Control (QC) Representative

**Table 5-1: QC Checklist**

Instructions: Initial each item, sign and date verifying that the requirements have been met.		
#	Description	Initials
1	All DDC Hardware is installed on a TP/FT-10 local control bus.	
2	Communication between DDC Hardware is only via EIA 709.1B using SNVTs. Other protocols and network variables other than SNVTs have not been used.	
3	All sequences are performed using DDC Hardware.	
4	LNS Database is up-to-date and accurately represents the final installed system	
5	All software has been licensed to the Government	
6	M&C software monitoring displays have been created for all building systems, including all override and display points indicated on Points Schedule drawings.	
7	Final As-built Drawings accurately represent the final installed system.	
8	O&M Instructions have been completed and submitted.	
9	Connections between the UMCS IP network and ANSI/CEA-709.1B building networks are through ANSI/CEA-852 Routers.	
By signing below I verify that all requirements of the contract, including but not limited to the above, been met.		
Signature: _____ Date: _____		

5.8.3.11. Perform a Performance Verification Test (PVT) under Government supervision prior to system acceptance. During the PVT demonstrate that the system performs as specified, including but not limited to demonstrating that the system is Open and correctly performs the Sequences of Operation.

5.8.3.12. Provide a 1 year unconditional warranty on the installed system and on all service call work. The warranty shall include labor and material necessary to restore the equipment involved in the initial service call to a fully operable condition.

5.8.3.13. Provide training at the project site on the installed building system. Upon completion of this training each student, using appropriate documentation, should be able to start the system, operate the system, recover the system after a failure, perform routine maintenance and describe the specific hardware, architecture and operation of the system.

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5.8.4. TESTING, ADJUSTING AND BALANCING. Test and balance air and hydronic systems, using a firm certified for testing and balancing by the Associated Air Balance Council (AABC), National Environmental Balancing Bureau (NEBB), or the Testing Adjusting, and Balancing Bureau (TABB). The prime contractor shall hire the TAB firm directly, not through a subcontractor. Perform TAB in accordance with the requirements of the standard under which the TAB Firm's qualifications are approved, i.e., AABC MN-1, NEBB TABES, or SMACNA HVACTAB unless otherwise specified herein. All recommendations and suggested practices contained in the TAB Standard shall be considered mandatory. Use the provisions of the TAB Standard, including checklists, report forms, etc., as nearly as practicable to satisfy the Contract requirements. Use the TAB Standard for all aspects of TAB, including qualifications for the TAB Firm and Specialist and calibration of TAB instruments. Where the instrument manufacturer calibration recommendations are more stringent than those listed in the TAB Standard, adhere to the manufacturer's recommendations. All quality assurance provisions of the TAB Standard such as performance guarantees shall be part of this contract. For systems or system components not covered in the TAB Standard, the TAB Specialist shall develop TAB procedures. Where new procedures, requirements, etc., applicable to the Contract requirements have been published or adopted by the body responsible for the TAB Standard used (AABC, NEBB, or TABB), the requirements and recommendations contained in these procedures and requirements are mandatory.

5.8.5. COMMISSIONING: Commission all HVAC systems and equipment, including controls, and all systems requiring commissioning for LEED Fundamental commissioning, in accordance with ASHRAE Guideline 1.1, ASHRAE Guideline 0 and LEED. Do not use the sampling techniques discussed in ASHRAE Guideline 1.1 and in ASHRAE Guideline 0. Commission 100% of the HVAC controls and equipment. The Contractor shall hire the Commissioning Authority (CA), certified as a CA by AABC, NEBB, or TABB, as described in Guideline 1.1. The CA will be an independent contractor and not an employee or subcontractor of the Contractor or any other subcontractor on this project, including the design professionals (i.e., the DOR or their firm(s)). The Contracting Officer's Representative will act as the Owner's representative in performance of duties spelled out under OWNER in Annex F of ASHRAE Guideline 0.

## 5.9. ENERGY CONSERVATION

5.9.1. The building including the building envelope, HVAC systems, service water heating, power, and lighting systems shall meet the Mandatory Provisions and the Prescriptive Path requirements of ASHRAE 90.1. Substantiation requirements are defined in Section 01 33 16, Design After Award.

5.9.2. Design all building systems and elements to meet the minimum requirements of ANSI/ASHRAE/IESNA 90.1. Design the buildings, including the building envelope, HVAC systems, service water heating, power, and lighting systems to achieve an energy consumption that is at least 30% below the consumption of a baseline building meeting the minimum requirements of ANSI/ASHRAE/IESNA Standard 90.1. Energy calculation methodologies and substantiation requirements are defined in Section 01 33 16, Design After Award.

5.9.3. Purchase Energy Star or FEMP designated products. The term "Energy Star product" means a product that is rated for energy efficiency under an Energy Star program. The term "FEMP designated product" means a product that is designated under the Federal Energy Management Program of the Department of Energy as being among the highest 25 percent of equivalent products for energy efficiency. When selecting integral sized electric motors, choose NEMA PREMIUM type motors that conform to NEMA MG 1, minimum Class F insulation system. Motors with efficiencies lower than the NEMA PREMIUM standard may only be used in unique applications that require a



high constant torque speed ratio (e.g., inverter duty or vector duty type motors that conform to NEMA MG 1, Part 30 or Part 31).

5.9.4. Solar Hot Water Heating. Provide at least 30% of the domestic hot water requirements through solar heating methodologies, unless the results of a Life Cycle Cost Analysis (LCCA) developed utilizing the Building Life Cycle Cost Program (BLCC) which demonstrates that the solar hot water system is not life cycle cost effective in comparison with other hot water heating systems. The type of system will be established during the contract or task order competition and award phase, including submission of an LCCA for government evaluation to justify non-selection of solar hot water heating. The LCCA uses a study period of 25 years and the Appendix K utility cost information. The LCCA shall include life cycle cost comparisons to a baseline system to provide domestic hot water without solar components, analyzing at least three different methodologies for providing solar hot water to compare against the baseline system.

5.9.5. Process Water Conservation. When potable water is used to improve a building's energy efficiency, employ lifecycle cost effective water conservation measures, except where precluded by other project requirements.

5.9.6. Renewable Energy Features. The Government's goal is to implement on-site renewable energy generation for Government use when lifecycle cost effective. See Paragraph 6, PROJECT SPECIFIC REQUIREMENTS for renewable energy requirements for this project.

## 5.10. FIRE PROTECTION

5.10.1. STANDARDS AND CODES Provide the fire protection system conforming to APPLICABLE CRITERIA.

5.10.2. Inspect and test all fire suppression equipment and systems, fire pumps, fire alarm and detection systems and mass notification systems in accordance with the applicable NFPA standards. The fire protection engineer of record shall witness final tests. The fire protection engineer of record shall certify that the equipment and systems are fully operational and meet the contract requirements. Two weeks prior to each final test, the contractor shall notify, in writing, the installation fire department and the installation public work representative of the test and invite them to witness the test.

5.10.3. Fire Extinguisher Cabinets: Provide fire extinguisher cabinets and locations for hanging portable fire extinguishers in accordance with NFPA 10 Standard for Portable Fire Extinguishers.

5.10.4. Fire alarm and detection system: Required fire alarm and detection systems shall be the addressable type. Fire alarm initiating devices, such as smoke detectors, heat detectors and manual pull stations shall be addressable. When the system is in alarm condition, the system shall annunciate the type and location of each alarm initiating device. Sprinkler water flow alarms shall be zoned by building and by floor. Supervisory alarm initiating devices, such as valve supervisory switches, fire pump running alarm, low-air pressure on dry sprinkler system, etc. shall be zoned by type and by room location.

5.10.5. Fire Protection Engineer Qualifications: In accordance with UFC 3-600-01, FIRE PROTECTION ENGINEERING FOR FACILITIES, the fire protection engineer of record shall be a registered professional engineer (P.E.) who has passed the fire protection engineering written examination administered by the National Council of Examiners for Engineering and Surveys (NCEES), or a registered P.E. in a related engineering discipline with a minimum of 5 years experience, dedicated to fire protection engineering that can be verified with documentation.

## 5.11. SUSTAINABLE DESIGN

5.11.1. STANDARDS AND CODES: Sustainable design shall conform to APPLICABLE CRITERIA. See paragraph 6, PROJECT-SPECIFIC REQUIREMENTS for which version of LEED applies to this project. The LEED-NC Application Guide for Multiple Buildings and On-Campus Building Projects (AGMBC) applies to all projects. Averaging may be used for LEED compliance as permitted by the AGMBC but is restricted to only those buildings included in this project. Each building must individually comply with the requirements of paragraphs ENERGY CONSERVATION and BUILDING WATER USE REDUCTION.

5.11.2. LEED RATING, REGISTRATION, VALIDATION AND CERTIFICATION: See Paragraph PROJECT-SPECIFIC REQUIREMENTS for project minimum LEED rating/achievement level, for facilities that are exempt from

the minimum LEED rating, for LEED registration and LEED certification requirements and for other project-specific information and requirements.

5.11.2.1. Innovation and Design Credits. LEED Innovation and Design (ID) credits are acceptable only if they are supported by formal written approval by GBCI (either published in USGBC Innovation and Design Credit Catalog or accompanied by a formal ruling from GBCI). LEED ID credits that require any Owner actions or commitments are acceptable only when Owner commitment is indicated in paragraph PROJECT-SPECIFIC REQUIREMENTS or Appendix LEED Project Credit Guidance

5.11.3. OPTIMIZE ENERGY PERFORMANCE. : Project must earn, as a minimum, the points associated with compliance with paragraph ENERGY CONSERVATION. LEED documentation differs from documentation requirements for paragraph ENERGY CONSERVATION and both must be provided. For LEED-NC v2.2 projects you may substitute ASHRAE 90.1 2007 Appendix G in its entirety for ASHRAE 90.1 2004 in accordance with USGBC Credit Interpretation Ruling dated 4/23/2008.

5.11.4. COMMISSIONING. See paragraph 5.8.5 COMMISSIONING for commissioning requirements. USACE templates for the required Basis of Design document and Commissioning Plan documents are available at <http://en.sas.usace.army.mil> (click on Engineering Criteria) and may be used at Contractor's option.

5.11.5. DAYLIGHTING. Except where precluded by other project requirements, do the following in at least 75 percent of all spaces occupied for critical visual tasks: achieve a 2 percent glazing factor (calculated in accordance with LEED credit EQ8.1) OR earn LEED Daylighting credit, provide appropriate glare control and provide either automatic dimming controls or occupant-accessible manual lighting controls.

5.11.6. LOW-EMITTING MATERIALS. Except where precluded by other project requirements, use materials with low pollutant emissions, including but not limited to composite wood products, adhesives, sealants, interior paints and finishes, carpet systems and furnishings,

5.11.7. CONSTRUCTION INDOOR AIR QUALITY MANAGEMENT. Except where precluded by other project requirements, earn LEED credit EQ 3.1 Construction IAQ Management Plan, During Construction and credit EQ 3.2 Construction IAQ Management Plan, Before Occupancy.

5.11.8. RECYCLED CONTENT. In addition to complying with section RECYCLED/RECOVERED MATERIALS, earn LEED credit MR4.1, Recycled Content, 10 percent except where precluded by other project requirements.

5.11.9. BIOBASED AND ENVIRONMENTALLY PREFERABLE PRODUCTS. Except where precluded by other project requirements, use materials with biobased content, materials with rapidly renewable content, FSC certified wood products and products that have a lesser or reduced effect on human health and the environment over their lifecycle to the maximum extent practicable.

5.11.10. FEDERAL BIOBASED PRODUCTS PREFERRED PROCUREMENT PROGRAM (FB4P). The Farm Security and Rural Investment Act (FSRIA) of 2002 required the U.S. Department of Agriculture (USDA) to create procurement preferences for biobased products that are applicable to all federal procurement (to designate products for biobased content). For all designated products that are used in this project, meet USDA biobased content rules for them except use of a designated product with USDA biobased content is not required if the biobased product (a) is not available within a reasonable time, (b) fails to meet performance standard or (c) is available only at an unreasonable price. For biobased content product designations, see <http://www.biopreferred.gov/ProposedAndFinalItemDesignations.aspx>.

5.12. CONSTRUCTION AND DEMOLITION (C&D) WASTE MANAGEMENT: Achievement of 50% diversion, by weight, of all non-hazardous C&D waste debris is required. Reuse of excess soils, recycling of vegetation, alternative daily cover, and wood to energy are not considered diversion in this context, however the Contractor must track and report it. A waste management plan and waste diversion reports are required, as detailed in Section 01 57 20.00 10, ENVIRONMENTAL PROTECTION.

5.13. SECURITY (ANTI-TERRORISM STANDARDS): Unless otherwise specified in Project Specific Requirements, only the minimum protective measures as specified by the current Department of Defense Minimum Antiterrorism Standards for Buildings, UFC 4-010-01, are required for this project. The element of those standards that has the most significant impact on project planning is providing protection against explosives effects. That

protection can either be achieved using conventional construction (including specific window requirements) in conjunction with establishing relatively large standoff distances to parking, roadways, and installation perimeters or through building hardening, which will allow lesser standoff distances. Even with the latter, the minimum standoff distances cannot be encroached upon. These setbacks will establish the maximum buildable area. All standards in Appendix B of UFC 4-010-01 must be followed and as many of the recommendations in Appendix C that can reasonably be accommodated should be included. The facility requirements listed in these specifications assume that the minimum standoff distances can be met, permitting conventional construction. Lesser standoff distances (with specific minimums) are not desired, however can be provided, but will require structural hardening for the building. See Project Specific Requirements for project specific siting constraints. The following list highlights the major points but the detailed requirements as presented in Appendix B of UFC 4-010-01 must be followed.

- (a) Standoff distance from roads, parking and installation perimeter; and/or structural blast mitigation
- (b) Blast resistant windows and skylights, including glazing, frames, anchors, and supports
- (c) Progressive collapse resistance for all facilities 3 stories or higher
- (d) Mass notification system (shall also conform to UFC 4-021-01, Mass Notification Systems)
- (e) For facilities with mailrooms (see paragraph 3 for applicability) – mailrooms have separate HVAC systems and are sealed from rest of building

## **6.0 PROJECT SPECIFIC REQUIREMENTS**

### **6.1. GENERAL**

The requirements of this paragraph augment the requirements indicated in Paragraphs 3 through 5.

### **6.2. APPROVED DEVIATIONS**

The following are approved deviations from the requirements stated in Paragraphs 3 through 5 that only apply to this project.

### **6.3. SITE PLANNING AND DESIGN**

#### **6.3.1. General:**

Refer to the Site Plans (See Appendix J) for proposed locations of improvements to be included under this scope of work.

#### **6.3.2. Site Structures and Amenities**

##### **6.3.2.1 Site Planning, Design and Construction Objectives**

This project is described as 'A' Avenue which is the Army AIT barrack. The Contractor shall be responsible for setting the locations of the new AIT Barracks building, Lawn Equipment Building (LEB), storm water management, 2-18,500sf physical training (PT) pits, covered bike racks, etc. within the limits of construction. The Contractor shall be responsible for the site planning, design and construction of all (but not limited to) functional and technical requirements listed in this task order including: demolition, erosion control measures (during construction), mechanical equipment, screen walls, underground conduit, piping, utility service lines and connections (communication, cable, storm drainage systems, natural gas, mechanical) etc. to the new barracks buildings and Lawn Equipment Building (LEB). The contractor is required to design all utilities, including private utilities. The private utility contractors will install, but not design, the water, sanitary and parking lot lighting. The contractor must coordinate installation with the private utility companies.

The master plan is bounded by 'A' Avenue, 'B' Avenue and from 11th Street up to 16th Street.

The master plan will include three 600 person Barracks (BCOF), one 300 person Barracks (BCOF), one Dining Facility (DFAC), one Brigade Headquarters (BDE HQ), two Battalion Headquarters (BN HQ), two Lawn Equipment Storage Buildings (LEB), seven physical training pits (PT), a running track, and appropriate parking space.

The 'A' Avenue site is in the northwest corner of 16th Street and 'A' Avenue. The contractor need to consider the entire building in the design and construction. The phase 1 portion of this building will construct approx. 65% of the total completed building (Phase 2 will construct the remaining portion). The Army AIT barracks is a part of the master plan for the AIT complex. Minimum ATFP and IDG setbacks are to be accommodated to ensure that the master plan will be met. A temporary gravel parking lot will provide forty (40) parking spaces for building personnel. A new twelve (12) foot wide concrete sidewalk is to be provided along 'A' Avenue for troop formations. Refer to the RFP drawings, included in Appendix J for suggested layout. The portion of 15th Street from 'B' Avenue to the access drive of Building 3327 shall remain open during the construction of this project.

##### **6.3.2.2 Site Structures and Amenities**

(a) Dumpster Pads: A Concrete dumpster pad shall be provided and shall extend a minimum of 20 feet in front of dumpster to accommodate the trash truck front wheels. Dumpster screen wall enclosures shall be provided. The

screen wall enclosures will visually match or be constructed of materials to match the new facility exterior walls. The color will match the new facility exterior wall. A gate keeper, capable of holding the gates in an open position, and a locking mechanism will be integrated into the gate design. Gates will have a minimum width of 12 feet. Dumpster locations will comply with criteria listed in Paragraph 4. Refer to the RFP drawings, included in Appendix J, for suggested locations of proposed dumpster pads and enclosures.

(b) Recycle Bins: Contractor to provide concrete pad for placement of recyclable material collection bin in the same location as the dumpster pads and enclosed with the dumpsters.

(c) Covered Bicycle Racks: Contractor to locate commercially manufactured covered bicycle racks near for use by staff and students for the 'A' Avenue site.

(d) Walks: Provide pedestrian walks within the designated construction area and connect to existing sidewalks, where applicable. Provide pedestrian access from the frontage road where appropriate.

(1) Sidewalks shall be a minimum of 6 feet wide, constructed of Portland Cement Concrete having a minimum nominal thickness of 4 inches. Walks used for loading will have a nominal thickness of 8 inches. Walks paralleling buildings shall be located beyond the eave drip line and at least 5 feet from the foundation.

(e) Fire Access Lanes: The Contractor shall provide fire access roads in accordance with UFC 3-600-01 and NFPA 1.

### 6.3.3. Site Functional Requirements:

#### 6.3.3.1. Stormwater Management (SWM) Systems.

For 'A' Avenue site drainage from this project shall be collected and detained as required by the Commonwealth of Virginia for new projects and facilities. The Contractor shall develop a master stormwater plan for the future built-out condition as depicted in the area master plan as described and shown in CS102 Appendix J. The stormwater plan shall be phased to accommodate current and future construction. The Contractor shall design a new storm drainage system (utilizing low impact development to the extent practicable and best management principals) to adequately collect, detain and discharge storm water into existing storm drainage system for AIT barrack.

The Contractor shall also be responsible for connecting roof drain systems to the underground system where applicable. The storm drainage system on Fort Lee is owned and operated/maintained by Fort Lee, Directorate of Logistics/Directorate Public Works (DPW). All costs associated with the design, installation and construction of the new storm drainage (including detention) system shall be the responsibility of the Contractor.

(a) During the design of the site, Fort Lee's storm water management measures are to be taken into consideration per Virginia Pollution Discharge Elimination System (VPDES). The site design is to incorporate strategies including a combination of structural practices, standards, and specifications that are appropriate for the site. The design shall consider long-term operation and maintenance of BMP's. Water quality protection will be considered in accordance with the Federal Clean Water Act, Virginia Code §§ 62.1-44.15 through 44.30, and Virginia Administrative Code 9 VAC 25-30-10 et seq.

(b) The DB Contractor shall ensure that work does not interrupt the flow of storm water nor interfere with the daily operations of the Installation.

(c) Fort Lee DPW is developing comprehensive storm water management policies that include, among other things, the following requirements:

1. Site designs shall minimize the generation of storm water and maximize pervious areas for storm water treatment. Structural and nonstructural infiltration BMPs shall be encouraged to provide storm water quality and quantity control and groundwater recharge.

2. Natural channel characteristics shall be preserved to the maximum extent practicable.

3. The use of low-impact development (LID) site planning and integrated management practices shall be strongly encouraged to control storm water runoff at the source and more closely approximate predevelopment runoff conditions.

(d) State and Federal design manuals that address proper storm water management design techniques, including the following:

1. Virginia Stormwater Management Handbook, Volumes I and II, prepared by the Virginia Department of Conservation and Recreation dated 1999, as amended.
2. VDOT Drainage Manual, prepared by the Hydraulics Section of the Virginia Department of Transportation dated 2002, as amended.
3. Virginia Erosion and Sediment Control Handbook, prepared by the Virginia Department of Conservation and Recreation dated 1992, as amended.
4. Low Impact Development Design Strategies: An Integrated Design Approach, United States Environmental Protection Agency, Office of Water, EPA 841-B-00-003 dated June 1999, as amended.
5. Low Impact Development Hydrologic Analysis, United States Environmental Protection Agency, Office of Water, EPA 841-B-00-002 dated June 1999, as amended.

The manuals referenced here should be used by designers to ensure that standard, acceptable design practices are used to develop their storm water management designs. Additional storm water management design requirements are included in Appendix CC.

6.3.3.1.1A Storm Water Pollution Prevention Plan that uses BMP's for erosion and sediment control will be developed in accordance with the Virginia Stormwater Management Handbook and Fort Lee's integrated stormwater pollution prevention plan. (Refer to paragraph 1.6 of Appendix E for requirements of Stormwater Pollution Prevention Plan and Permit requirements.).

Contractor shall install stabilized construction entrances in accordance with the Virginia Erosion and Sediment Control Handbook. Contractor shall also minimize tracking soil onto adjacent roadways. Contractor shall sweep roadways as necessary to remove tracked soil and dust.

Stormwater drainage shall meet the requirements of Energy Independence and Security Act: Section 438 and Low Impact Drainage Design Implementation.

#### 6.3.3.2. Erosion and Sediment Control

Erosion and sediment control shall be provided in accordance with the Virginia Erosion and Sediment Control Handbook (latest edition).

#### 6.3.3.3. Vehicular Circulation.

Phase 1 will require a portion of 15th St to be closed. The portion of 15th Street from 'B' Avenue to the access drive of Building 3327 shall remain open during the construction of this project. In future phases 15th Street will be closed between 'A' Ave and 'B' Ave. 'B' Ave will become a pedestrian walkway in future phases allowing for the proposed Barracks to be located within the 82' ATRP setback. 12th Street will be closed in future phases of the master plan allowing for the proposed Brigade and Battalions to be located within the 82' ATRP setback.

### 6.4. SITE ENGINEERING

#### 6.4.1. Existing Topographical Conditions

See Appendix J for topographic survey and site layout plan. Information shown is approximate. Contractor will field verify surface and utility elevations. Bring any discrepancies which may be found in the furnished surveys or drawings to the immediate attention of the Government for clarification.

6.4.2. Existing Geotechnical conditions: See Appendix A for a preliminary geotechnical report.

A Preliminary Geotechnical Report has been prepared and is included in Appendix A. For further information regarding the included geotechnical report and the Contractors requirements for completing a post-award final geotechnical evaluation report see Paragraph 5.2.2.1 and Section 01 33 16, *Design After Award*, Paragraph 3.5.3.

If the information on the existing geotechnical conditions provided herein is not consistent with the conditions encountered during the final geotechnical exploration, it is the responsibility of the Contractor to establish a meeting with the Government to outline the differences and the potential impact. *NOTE: The included preliminary geotechnical report covers both the advertised project and an additional barracks project at Ft Lee. The geotechnical information and subsurface data specific to the advertised project is differentiated in the attached report as "Site A".*

6.4.3. Fire Flow Tests See Appendix D for results of fire flow tests to use for basis of design for fire flow and domestic water supply requirements.

See Appendix D for results of preliminary fire flow tests to use for basis of design for fire flow and domestic water supply requirements. The Contractor shall conduct fire flow tests to be used for the final design and construction of the fire protection system.

6.4.4. Pavement Engineering and Traffic Estimates:

Not Used

6.4.5. Traffic Signage and Pavement Markings

Traffic signage and striping will be provided for all new parking areas. Signage and striping will be designed in accordance with Manual on Uniform Traffic Control Devices for Streets and Highways.

6.4.6. Base Utility Information

#### 6.4.6.1 EXISTING UTILITY LOCATIONS

Existing utilities must be located before doing any digging work on the Facility. The Contractor shall be responsible to contact Miss Utility, obtain all existing utility locations which may be necessary to accomplish his work, and mark any utility lines in the immediate vicinity of his work. It shall be the responsibility of the Contractor to contact Miss Utility at 1-800-552-7110 for locating commercial utilities 48 hours prior to digging operations.

#### 6.4.6.2 UTILITY CONNECTIONS

(a) Connections to existing or extended utilities shall be coordinated with Fort Lee DPW and the privatized utility companies.

(b) The Contractor shall schedule the work so as to cause as little interruption of utility services as possible during normal work day hours, 0700 to 1630 hours Monday through Friday. **ALL** utility interruptions shall be coordinated with the Contracting Officer. The Contractor shall provide no less than 15 days notice of intended utility interruption to the Contracting Officer. Water and electrical services shall be terminated only as necessary, and shall be restored at the end of each working day. The Contractor shall provide temporary water and electrical services and shall coordinate with VAW and DVP.

#### 6.4.6.3 SANITARY SEWER SYSTEM

(a) Old Dominion Utility Services (ODUS) has obtained full ownership of all wastewater collection facilities at Fort Lee. All wastewater system modifications to the points of contractual demarcation including plugging, adjustments, new install, maintenance, etc. shall be performed by ODUS and/or ODUS's designated subcontractors. The point of demarcation shall be as shown in the ODUS Contract Section J06.10 Wastewater System Points of Demarcation.

(b) Modifications to the existing wastewater facilities shall be constructed by ODUS.

(c) Prior to ODUS performing system modifications, a Request for Proposal (RFP) shall be coordinated by the contractor with the Contracting Officer. This RFP is not the same as the Design Build Request for Proposal often prepared by the USACE. This RFP is typically a one page document that can be obtained from ODUS's Contracting Officer Representative (COR) Leroy Good with the Fort Lee DPWL. Mr. Good's contact information is 804-734-5092 or [leroy.good@us.army.mil](mailto:leroy.good@us.army.mil). The Government will be responsible to pay for ODUS sanitary sewer modifications.

(d) The sanitary system design shall meet the requirements of ODUS's standards and specifications and the Virginia Department of Environmental Quality (VDEQ) Sewage Collection and Treatment (SCAT) regulations. Where conflicts exist, the more stringent specification shall apply. Please contact Brandon LoGioco with ODUS for the ODUS standards and specifications at 757-888-0485 or [blogioco@odus.asusinc.com](mailto:blogioco@odus.asusinc.com). Only the standards and specifications received from the ODUS office will be acceptable.

(e) For new install or replacement of sewer services to buildings, ODUS will install a cleanout five (5) feet outside of the face of the building and make the connection to the building's internal plumbing if available. If the building's internal plumbing has not been installed the plumber shall make the connection to the backside of the wye for the cleanout.

(f) In order to protect the integrity of the system, ODUS will repair all wastewater systems damaged during the course of construction. The party responsible for the damage, in accordance with MISS Utility procedures, will be responsible to pay for correcting the damages.

#### 6.4.6.4 WATER SYSTEM

(a) The 5-story buildings are expected to require fire pumps and water service is to be the side of the barracks which faces A Avenue. Water meters are required on all buildings. Provide Fire department access within 3 sides of the building in accordance with UFC 3-600-01.

(b) The water distribution system on Fort Lee has been privatized. The water system is owned and operated by Virginia American Water Company (VAWC). Therefore, all new project related water supply construction (up to the five foot line of new facilities and to new fire hydrants) on Fort Lee shall be accomplished by VAWC. Contact Virginia American Water Company (VAWC) for water service requirements necessary to support the new barracks buildings and new exterior strategically located (in accordance with UFC 3-600-11) fire hydrants. The contact person at VAWC is Mr. Wesley Allen at 804-530-4345 ext 103. Upon request and coordination by the Contractor VAWC will install (per the Contractor's designed drawings) the water service supply lines (up to the five foot line of the new barracks buildings and fire hydrants). All costs associated with new water services for domestic and fire protection purposes includes (but is not limited to) tapping fee, pipeline installation, valve and valve box installation, meter and meter box, fire hydrants, protective bollards, demolition and removal of existing conflicting water lines, utility cut pavement patching, etc. and shall be the responsibility of the Government.

#### 6.4.6.5 Fire Sprinkler Service

A minimum of one separate fire sprinkler service connection shall be provided with the barracks building. A fire sprinkler main will be constructed to the barracks building five foot line by Virginia American Water Company (VAWC). Construction of fire water supply line from the buildings five foot line to the building is the responsibility of the Contractor. VAWC is responsible for the post indicator valve (PIV) and the Fire Department Connection (FDC). Fire water supply line shall not be metered. The Contractor is not responsible for costs incurred for services provided by others. See Paragraph 6.4.3 for fire flow test information. The D/B contractor is responsible for the design of the utility system in terms of meeting code and criteria requirements (correct number of hydrants, location of PIV, etc.).



#### 6.4.6.6 Electrical Service

- (a) The electrical infrastructure system at Fort Lee has been privatized and is owned by Dominion Virginia Power (DVP). DVP point of contact is Dennis Collins at (804) 862-6010 or [dennis\\_collins@dom.com](mailto:dennis_collins@dom.com).
- (b) The D/B Contractor shall coordinate all electrical service connections with the DVP privatized utility. Submission of load letters and documentation supporting the site location of transformers and meter equipment will also be coordinated and approved. Contractor shall provide design drawings in ACAD 2006 LT to DVP as required to obtain service quotes.
- (c) The D/B Contractor is responsible for the design and construction of the electrical systems from the five-foot building line into and within the building. All electrical systems shall be designed and constructed in accordance with Local, State, and Federal standards as listed in Paragraph 4. Local and State standards will dictate unless the Federal standards are more stringent. Refer to DVP Blue Book online at <http://www.dom.com/customer/pdf/bluebook.pdf>
- (d) DVP will be responsible for providing the meter.

#### 6.4.6.7 Water Utility

Refer to Paragraph 6.4.6.4.

#### 6.4.6.8 Sanitary Utility

Refer to Paragraph 6.4.6.3.

#### 6.4.6.9 Gas Utility

- (a) The natural gas utility service at Fort Lee has not been privatized. Natural gas is currently provided to Fort Lee by Columbia Gas of Virginia (CG).
- (b) The DB Contractor shall coordinate the anticipated natural gas demand with Fort Lee DPW/DOL and with CG.
- (c) The Contractor shall design and construct the natural gas system from the connection with the main to the gas meter in coordination with Columbia Gas.
- (d) The DB Contractor is responsible for the design and construction of the natural gas distribution from the meter to each point of use within the building. All natural gas systems shall be designed constructed in accordance with UFC and Local, State, and Federal standards as listed in Paragraph 4. Local and State standards will dictate unless the Federal standards are more stringent.

#### 6.4.6.10 Cable Television (CATV)

Cable television is owned and operated by Comcast on Fort Lee. The point of contact for Comcast is Wilbur Morris at 804-915-5259. The D/B Contractor shall coordinate with Comcast and provide (1) 4" conduit stubbed out from the building to allow Comcast to bring in their cable and terminate it on the CATV backboard in the telecommunications room.

#### 6.4.6.11 Telecommunications Service

- (a) The telecommunication infrastructure system at Fort Lee has not been privatized and is managed by the Fort Lee Network Enterprise Center (NEC). Call NEC at (804)-734-7250 to be directed to the proper point of contact.
- (b) The D/B Contractor shall contact and coordinate all telecommunications service connections with NEC.

(c) The D/B Contractor shall coordinate telecommunication infrastructure design and construction requirements with the NEC and USAISEC Site Engineer through the Corps of Engineers, Resident Engineer or other USACE POC as designated. Construction drawings and specifications shall be coordinated with USAISEC, Fort Detrick Engineering. (For a copy of the I3A Guide, contact USAISEC-FDED, email: DetrickISECI3Aguide@conus.army.mil) ISEC Fort Lee point of contact is Ron Michon, michonr@lee.army.mil.

(d) The D/B Contractor is responsible for the design and construction of the telecommunication systems within the building and from the building to the connection point with the installation infrastructure. All communication shall be designed and stamped by a Registered Communication Distribution Designer (RCDD). The D/B Contractor shall engineer, furnish, install, secure, and test (EFIS&T) the telecommunications and information technology infrastructure and make operational to include, but not limited to, the installation of outside cabling, manholes, conduit, duct bank system, and connections.

(e) The D/B Contractor shall refer to telecommunication systems in section 6.9 for additional outside plant distribution and design information.

#### 6.4.7. Cut and Fill

See topographic survey data in Appendix J for the anticipated earthwork cuts and fills to bring the site to final grade. Any off-site borrow soils required to bring the site to final grade or to backfill below grade structure walls, earth retaining structures, or utility trenches shall be approved by the government before use. Unsatisfactory soils, as defined in the Geotechnical Report, shall be hauled off site and disposed of in accordance with criteria.

Compaction requirements for fill shall be based on ASTM D1557, Modified Proctor compaction. Notify the licensed geotechnical engineer that will be preparing the final Geotechnical evaluation report of this requirement.

The near surface soils at the project site primarily consist of fine grained soils as indicated in the Preliminary Geotechnical Engineering Report in Appendix A. These fine grained soils are susceptible to strength loss and deterioration from exposure to excess moisture (precipitation) and manipulation by construction equipment. Portions of these fine grained soils are often problematic with regard to providing a firm and stable subgrade and often exhibit pumping and rutting during proof-rolling. The Contractor should be aware that pumping and rutting soils will need to be undercut and replaced with appropriate fill and should account for such contingencies in their proposal. Any over-excavation due to the action/inaction of the Contractor, or done to expedite the Contractors construction time, will be at no additional cost to the Government.

Ensure that the licensed project design geotechnical engineer oversees and directs proof rolling operations (for subgrade suitability); fill placement and compaction operations, including associated soil properties, compaction, and field density testing; and footing inspections on a full time basis. A Corps of Engineers validated geotechnical testing firm shall inspect, test, and document earthwork construction.

#### 6.4.8. Borrow Material

Any off-site borrow soils required to bring the site to final grade or to backfill below grade structure walls, earth retaining structures, or utility trenches shall be approved by the government before use. The finished grades adjacent to the new building will be a minimum of 6" below finished floor except where grades are required on walk ways and entrances to buildings that are handicap accessible. Finish grades will slope away from the building at 5% for the first 10 feet and then will slope at a minimum of 1% to existing or new storm drainage

#### 6.4.9. Haul Routes and Staging Areas

The Contractor will be allowed to use Fort Lee road system for transporting construction materials and debris to and from the project sites. Care shall be taken to minimize "tracking" of mud from the project sites with regular cleaning of equipment and street cleaning. The route for hauling of such material and debris shall be coordinated with the contracting officer prior to the start of construction.

#### 6.4.10. Clearing and Grubbing:

All cleared shrubs and vegetation shall be chipped, shredded, and composted. Cleared shrubs and vegetation shall not be removed to stockpile on-site or off-site. Remove all soils to be stripped to a depth recommended by

the contractor's geotechnical engineer. Note that the provided preliminary geotechnical report states that the topsoil and existing pavement encountered in the borings located within the project site ranged from 6 to 9 inches thick.

Clearing and grubbing of unsuitable materials may result in surface soil disturbances up to 36-inches, especially with regard to the removal of root balls from large sized trees. Following clearing and grubbing operations, the Contractor should realize that certain areas of the site may need to be backfilled with controlled structural fill and should account for such contingencies in their proposal.

#### 6.4.11. Landscaping:

,Landscaping/Sodding: The Contractor shall establish turf in all disturbed areas. The Contractor also shall develop a site landscaping plan for the portion of the building along A Avenue and the west side of the building. The plan shall incorporate plantings from the approved planting list shown in Appendix I of this RFP. Selection of planting and locations used shall also be in accordance with AT/FP requirements, Fort Lee's ADG and National Nursery Standards.

#### 6.4.12. Turf:

In addition to the requirements of the Paragraph "Landscaping", seed mixes must be approved by the Ft Lee Environmental Office see Appendix E.

### 6.5. ARCHITECTURE

6.5.1. General: To the maximum extent possible within the contract cost limitation, the buildings shall conform to the look and feel of the architectural style and shall use the same colors as adjacent facilities as expressed herein. The Government will evaluate the extent to which the proposal is compatible with the architectural theme expressed in the RFP during the contract or task order competition. The first priority in order of importance is that the design provides comparable building mass, size, height, and configuration compared to the architectural theme expressed herein. The second priority is that design is providing compatible exterior skin appearance based upon façade, architectural character (period or style), exterior detailing, matching nearby and installation material/color pallets, as described herein.

#### 6.5.2. Design

6.5.2.1. Appendix F is provided "For Information Only", to establish the desired site and architectural themes for the area. Appendix F identifies the desired project look and feel based on Fort Lee's Installation Architectural Theme from existing and proposed adjacent building forms; i.e. building exterior skin, roof lines, delineation of entrances, proportions of fenestration in relation to elevations, shade and shadow effects, materials, textures, exterior color schemes, and organizational layout.

6.5.2.2. The design should address Fort Lee's identified preferences. Implement these preferences considering the following:

- (a) Achievable within the Construction Contract Cost Limitation (CCL)
- (b) Meets Milestones within Maximum Performance Duration.
- (c) Achieves Full Scope identified in this Solicitation
- (d) Best Life-Cycle Cost Design
- (e) Meets the Specified Sustainable Design and LEED requirements
- (f) Complies with Energy Conservation Requirements Specified in this RFP.

6.5.2.3. Priority #1. Visual Compatibility: Facility Massing (Size, Height, Spacing, Architectural Theme, etc.) Exterior Aesthetic Considerations: The buildings massing, exterior functional aesthetics, and character shall create a comprehensive and harmonious blend of design features that are sympathetic to the style and context of the Installation. The Installation's intent for this area is:

To match the architectural style for the immediate vicinity.

6.5.2.4. Priority #2. Architectural Compatibility: Exterior Design Elements (Materials, Style, Construction Details, etc.) Roofs, Exterior Skin, and Windows & Door Fenestrations should promote a visually appealing compatibility with the desired character while not sacrificing the integrity and technical competency of building systems.

6.5.2.5. See Appendix F for exterior colors that apply to Architectural character at Fort Lee. The manufacturers and materials referenced are intended to establish color only, and are not intended to limit manufacturers and material selections.

6.5.2.6. Additional architectural requirements:

(a) Install fall protection anchor points on all roofs with a slope greater than 2:12

6.5.2.7 Compatibility: Exterior must be visually compatible with surrounding buildings. Proposed facilities should be

sympathetic to existing facility styles, but may employ new material and color pallets. Refer to Appendix F for exterior

colors.

6.5.3. Programmable Electronic Key Card Access Systems:

Key Card Access System: A Programmable Electronic Key Card Access System shall be provided on all exterior entry/egress doors, as well as all other doors in the facility with the exception of doors leading into mechanical rooms, electrical rooms, communication rooms and janitor closets. Extension of the existing Installation key card access system shall be provided, the existing Installation key card access system is BESTLOCK. The Design-Build Contractor shall coordinate with the Contracting Officer Representative for keying requirements. A Programmable Electronic Key Card Access System Manufacturer's Representative shall install all hardware and software necessary for the operation of the Electronic Key Card Access System and program all locksets. Provide six (6) blank key cards for each personnel each building is designed to accommodate. The Design-Build Contractor shall furnish in three-ring binders, one full set of the system manufacturer's system training manual, system maintenance manual, and one training video (in format provided by the system manufacturer), with each system installed. The Programmable Electronic Key Card Access System Manufacturer's Representative shall provide two (2) separate 4-hour classes of training for the user on software use, programming locks, encoding cards and printing reports. Each building shall be furnished with a complete stand-alone key card system package. System shall be capable of being compartmentalized so that each building has only the capability to produce key cards for that building. Provide a two (2) year warranty on the system and all components and locksets. All special tools, software, connecting cables and proprietary equipment necessary for the maintenance, testing, and reprogramming of the system shall be furnished to the Contracting Officer Representative

6.5.4. INTERIOR DESIGN

(a) Public spaces of each building will have design interest; color scheme will be neutral with the appropriate selection and placement of color, texture and patterns. Accent color or layering of colors will be considered for the walls and flooring to highlight and accentuate architectural features. Flooring will be designed with minimal patterning.

(b) Electrical and cable outlets shall be coordinated with machines so that the outlets are located behind them.

Interior building signage requirements:

Include interior signage plans or schedules showing location and quantities of all interior signage. Key each interior sign to a quantitative list indicating size, quantity of each type and signage text.

6.6. STRUCTURAL DESIGN

6.6.1 General

Consider mission effectiveness, the most economical system in the locality, life-cycle economics, and space adaptability in choosing the structural systems. Space adaptability includes future reorganization or reallocation of space.

Analyze, design, and detail the 300 person Army barracks, Phase I, as a complete structural system. The design must presume and anticipate a future 300 person, FY12 addition, Phase II. Additionally the design must be aware that Phase II may never be constructed. Phase I shall be able to both stand alone and be expanded by Phase II with minor disruption to Phase I and with very minor demolition to Phase I, maintaining services to Phase I at all times. Design structural elements to preclude damage to finishes, partitions, and other frangible, nonstructural elements; to prevent impaired operability of moveable components; and to prevent cladding leakage and roof ponding. Limit deflections of structural members to the allowable of the applicable material standard, e.g. ACI, AISC, Brick Industry Association (BIA).

Consider climate conditions, high humidity, industrial atmosphere, saltwater exposure, or other adverse conditions when selecting the type of cement and admixtures used in concrete, the concrete cover on reinforcing steel, the coatings on structural members, expansion joints, the level of corrosion protection, and the structural systems. All concrete shall be a minimum of 3,000 psi and shall be steel reinforced. Place floor mounted mechanical and electrical equipment on a 4" minimum concrete pad.

In addition to gravity, seismic, and lateral loads, design ancillary building items, e.g. doors, window jambs and connections, overhead architectural features, equipment bracing, for the requirements of UFC 4-010-01, DOD Minimum Antiterrorism Standards for Buildings. Ensure and document that the design of glazed items includes, but is not limited to, the following items under the design loads prescribed in UFC 4-010-01:

- (a) Supporting members of glazed elements, e.g. window jamb, sill, header
- (b) Connections of glazed element to supporting members, e.g. window to header
- (c) Connections of supporting members to each other, e.g. header to jamb
- (d) Connections of supporting members to structural system, e.g. jamb to foundation.

#### 6.6.2 Applicable Standards, Codes, and Criteria

The structural design shall fully comply with the following listed criteria in addition to the provisions provided in Section 01 10 00 paragraph 4.0 Applicable Criteria. Use the latest edition of the International Building Code (IBC) for design guidance, and coordinate design with UFC 4-010-01. For buildings three stories and taller, design for progressive collapse in accordance with UFC 4-023-03, Design of Buildings to Resist Progressive Collapse.

#### 6.6.3 Project Specific Design Loads:

#### 6.6.3.1. Building Occupancy Category III

6.6.3.2. Ground Snow: 20 psf

6.6.3.3. Wind Speed: 90 mph, Exposure C

6.6.3.4. Frost Penetration: 14 inches

6.6.3.5. Seismic Design Data: The mapped maximum considered earthquake (MCE) spectral response accelerations for site class B are:

Ss (at short periods) = 19% g

S1 (at 1-second period) = 6% g

The acceleration values identified are for the general location of the facility. Verify and use site specific criteria based on the final site location of the facility. Adjust site class per IBC to match specific site information in geotechnical report.

6.6.3.6. Antiterrorism/Force Protection loads and minimum requirements are per UFC 4-010-01. For design of structural components subjected to dynamic loads, the U.S. Army Corps of Engineers Protective Design Center (PDC) developed SBEDS, Single-Degree-of-Freedom Blast Effects Design Spreadsheets (SBEDS). SBEDS is available at the software tab of the PDC website, HYPERLINK "https://pdc.usace.army.mil/"<https://pdc.usace.army.mil/>.

#### 6.6.4 Foundation

The foundation is site specific and must be designed upon known geotechnical considerations by an engineer knowledgeable of the local conditions, e.g. highly expansive soils, groundwater levels. Coordinate the need for a vapor barrier with the architectural floor finishes and requirements of the geotechnical report. All slab-on-grade to receive a coating (e.g. epoxy) or to receive an overlaying finish (e.g. carpet or tile), shall be underlain by a vapor barrier system with a minimum 10-mil polyethylene membrane.

#### 6.6.5 Site Features – Retaining Walls/Bridges/etc.

Design site features, e.g. retaining walls, culverts, bridges, in accordance with the appropriate American Association of State Highway and Transportation Officials (AASHTO) criteria including AASHTO LRFD Bridge Design Specifications, AASHTO Standard Specifications for Highway Bridges, and AASHTO Guide Specifications for Design of Pedestrian Bridges. Consider operation and maintenance requirements, e.g. painting, mowing, inspecting, routine maintenance. Design site features to drain properly in order to meet loading assumptions.

#### 6.6.6 Types of Construction

Timber construction is prohibited.

## 6.7. THERMAL PERFORMANCE

6.7.1 STANDARDS AND CODES: Building construction shall conform to APPLICABLE CRITERIA.

6.7.2 Thermal Characteristics. Building construction shall conform to the current version of ASHRAE 90.1. All buildings shall be classified as non-residential. "R" and "U" values shall be calculated in accordance with ASHRAE methods.

6.7.3 Thermal Insulation. Thermal insulation shall have a flame-spread rating of 25 or less and a smoke-development rating of 50 or less, exclusive of the vapor barrier, when tested in accordance with ASTM E84. A vapor barrier shall be provided on the warm-in-winter side of the exterior wall and ceiling insulation. Polystyrene is allowed as an insulation material for slabs and outside concrete or unit masonry walls. It is prohibited as an injected insulation material in walls or floor cavities or within the building envelope.

6.7.4 Infiltration. To limit air infiltration, buildings will be sealed with an air infiltration barrier, installed in accordance with the manufacturer's recommendations. The building envelope shall be caulked, gasketed, weather-stripped or otherwise sealed: around window and door frames, between wall cavities and frames, between walls and ceiling and roof, between walls and floors, at access doors and panels, at utility penetrations through walls, floors and roofs, and at any other exterior envelope joint which may be a source of air leakage. These steps shall constitute tight building construction.

6.7.5 Humid Area Design. Climates which have 1500 hours or more of 73 degree F (22.8 deg C) or higher wet bulb temperature in combination with an outside design condition of 50 percent or higher relative humidity shall be considered humid areas. An effective infiltration barrier is critical to limiting moisture flow into conditioned occupied spaces. Provide materials on the interior side of vapor barrier that have high permeable rating, 7 or higher, that will not inhibit the remaining vapor to enter the room. The vapor barrier in humid areas shall have a maximum perm rating of 0.5, and shall be located on the outside face of the exterior wall or ceiling insulation. Moisture analysis calculations shall be provided to demonstrate compliance with requirements.

## 6.8. PLUMBING

6.8.1 The plumbing system design shall be in compliance with the International Plumbing Code with standard diversities for sizing of all water, drainage, and vent piping.

6.8.2 Utility Connections: Provide all utilities from the utility meter to each building or facility.

6.8.3 Utility Metering: Domestic water and natural gas utilities shall be metered. The D/B Contractor shall provide the natural gas meter, pressure regulator and all associated appurtenances. The water meter shall be provided by the water privatized utility provider.

6.8.4 Piping Materials: Piping materials shall be complied with applicable criteria and codes but may be restricted based on specific conditions at a particular site.

6.8.5 Cross Connection Control: All local site specific requirements for cross connection control / backflow prevention shall be followed. Domestic water main entering the building shall be provided with a reduced pressure

backflow preventer. Additionally, domestic water systems shall be protected from contamination by hydronic water systems and other HVAC systems via a reduced pressure zone backflow preventer.

6.8.6 Natural Gas Supply: The natural gas system is owned and operated by Ft Lee DPW. The D/B Contractor shall coordinate with Ft Lee DPW to obtain the gas pressure available at the project site. Additionally, the D/B contractor shall provide Ft Lee DPW their required flow rate and expected gas usage. The D/B contractor also shall coordinate with Ft Lee DPW to natural gas meter requirements. Gas meter and piping shall be sized with all loads are firing at the same time.

6.8.7 Gas Regulator Venting: All gas regulators in building shall be vented to the outside. All gas piping shall be in compliance with applicable criteria and codes.

6.8.8 Domestic Water Heating: Domestic hot water shall be designed to maintain at 140 degrees F at the storage tanks. Hot water delivered to plumbing fixtures shall be designed for 110 degrees F.

6.8.9 Water Service Utility Provider (WSUP) Coordination: The D/B Contractor shall provide water service and fire water service to the building. Contractor shall connect to the meter to provide domestic water service to the facility. A backflow prevention device shall be provided at the domestic water main entrance located in the mechanical room.

6.8.10 Sanitary sewer connection will be required as shown on the drawing. **Specific points of connection for building utilities shall be coordinated with the privatized sanitary provider.**

6.8.11 Equipment Pads: Floor or on-grade mounted equipment shall be elevated on 6 inch thick concrete pads to prevent accumulation of water and metal corrosion.

6.8.12 Exterior Water Piping Freeze Protection: Seasonally (not used in winter) utilized water supply piping shall detailed and installed for complete drain down and shall be provided with an interior or below grade isolation valve. Exposed water piping that is utilized year round shall be insulated and heat traced and protected with pipe jacketing to ensure that the piping will not freeze.

6.8.13 Janitor Closets: In janitor spaces/room/closets provide at minimum a floor drain and a service/janitorial sink.

6.8.14 Stop Valves for Specific Equipment Domestic Water Supply: Stop valves shall be provided for refrigerators and ice makers and shall have ball valves.

6.8.15 Trap Primers: Provide automatic trap primers for floor drains as per International Plumbing Code.



6.8.16 See Paragraph 6.15 Environmental and Appendix E for additional requirements.

## 6.9. SITE ELECTRICAL AND TELECOMMUNICATIONS SYSTEMS

### 6.9.1 Electrical, Communications, and Cable Television Demolition

The completed site plans shall include power, communications, and CATV demolition. Demolition of the existing systems (if required) shall be coordinated with the points of contact from section 6.4 to the nearest location as required by the applicable utility.

### 6.9.2 Electrical

(a) DVP owns and operates the 13.2 kV electrical distribution system (aerial and underground) on Fort Lee.

Electrical distribution system, transformer and secondary capacity to support the new service at the facility will

be determined by DVP, based on electrical load information provided by the Contractor. The Contractor will

complete a DVP load letter for all electrical service requests. This load letter can be found on DVP's web site, HYPERLINK "www.dom.com" [www.dom.com](http://www.dom.com) (type Load Letter in search box). See Appendix GG for DVP Fort Lee Project Requirements.

(b) DVP will be responsible for the design and construction of all exterior electrical distribution system, transformation and secondary service work up to 5 feet within the new facility as per the requirements of the DVP Information and requirements for Electric Service "Blue Book". The DVP Point of connection (service delivery point) at the facility shall be as specified in the "Blue Book" and includes exterior mounted CT cabinet, meter base, electrical switchgear or panelboard within the new facility (5' rule applies), etc.

Specification for all termination/metering compartments for switchboard/switchgear equipment must have written approval by Dominion prior to material procurement. Contractor shall provide an empty conduit from the metering section to the exterior mounted meter base to allow for DVP exterior metering. Contractor shall coordinate location and requirements with DVP. Reference DVP's Information and Requirements for electrical service connections.

(c) The Contractor will engage DVP to perform this work and the Government will pay all associated costs; the Contractor shall carefully adapt scheduling and performing the work under this contract to fully coordinate with and accommodate work by DVP.

### 6.9.3 Lighting

(a) The D/B Contractor will provide a complete exterior lighting design for the AIT Barracks. The parking lot, sidewalk, area, and street lighting will be furnished, installed and maintained by DVP. The contractor's exterior lighting design will utilize DVP standard fixtures and poles. Parking lot lighting design will utilize Cooper type RC luminaries. Lighting layout and lighting fixtures will minimize light pollution by utilizing fixture incorporated light cutoff appliances.

(b) All additional exterior lighting not listed above (i.e. building mounted lighting, site lighting, sign

lighting, etc.) shall be furnished and installed by the D/B Contractor. These lighting fixtures will be powered from the Barracks electrical system. All exterior luminaries will be actuated by a photoelectric control unless otherwise indicated.

#### 6.9.4 Telecommunications

(a) The D/B Contractor shall coordinate with the Fort Lee NEC for the installation of the outside plant infrastructure and the connections for both fiber optic and copper cables.

(b) All telecommunication work shall be designed and stamped by a Registered Communication Distribution Designer (RCDD).

(c) AIT Barracks Site: Provide 600 pair copper and 12 strand single mode fiber optic cable to the barracks. The D/B contractor shall install one six-way manhole (MH) and one nine-way manhole in the AIT Complex site. The six-way manhole shall be installed at the west end of the AIT complex, and the nine-way manhole shall be installed at the east end of the AIT complex. The D/B Contractor shall run (4) 4" concrete encased ducts to the AIT Barracks. The D/B Contractor shall install 900 pair, 24 AWG copper cable from the nine way MH to MH B14 south to MH B14B to MH to MH B12 to MH B11 north to MH B101 where the 900 pair cable will be spliced. The cable and pairs to splice will be coordinated with NEC. Ninety-six strands of single mode fiber shall follow the same path as the copper and shall be spliced in MH B101. One duct shall contain (4) 1" mesh innerducts with pull string. Pull fiber through the mesh innerduct. See Appendix AA - Telecommunications Site Plan.

#### 6.9.5 Cable Television (CATV)

(a) The D/B Contractor shall provide a 4-inch empty conduit stub out 5 feet from the building exterior for Comcast to bring in their service cable and terminate on the CATV board in the main telecommunications room. Coordinate with Comcast the exact location of the stub out.

(b) The Government will engage Comcast to perform this work and pay all associated costs; however, the D/B Contractor shall carefully adapt scheduling and performing the work under this contract to fully coordinate with and accommodate work by Comcast.

### 6.10. FACILITY ELECTRICAL AND TELECOMMUNICATIONS SYSTEMS

#### 6.10.1 Facility Electrical Systems

6.10.1.1 Service connection: The point of demarcation for the DVP shall be as specified in the DVP Blue Book, and the Contractor shall coordinate this with DVP. Electrical meter shall be connected to Ft. Lee's UMCS via the facility's DDC cabinet.

6.10.1.2 Building Service Equipment: D/B contractor shall provide and install the building service equipment switchboard/switchgear with the size for the entire load of both phase-I and phase II. In addition, D/B contractor shall provide and install a set of empty conduits with pull wires for future phase-II. This set of empty conduits shall be run from electrical rooms of each floor to the main electrical room on first floor. The size and the number of empty conduits shall be the same as this phase-I.

6.10.1.3 Laundry room: Provide a general use 125-volt duplex receptacle on each laundry room wall in addition to those required for washers and dryers.

6.10.1.4 Cable TV (CATV): In addition requirements listed under paragraph 3.8.7 CATV, D/B contractor shall provide and install a pre-wire CATV system throughout the designated spaces. Leave ten feet of slack cable in the communications room at a location designated for the CATV box. All horizontal cabling shall be homerun from the CATV outlet to the nearest telecommunications room. CATV connectivity shall be provided in: all multipurpose spaces, day rooms, private offices, and sleeping units. D/B contractor shall provide and install a 4" empty conduit with pull wires from communication rooms of each floor to the main communication room on first floor. Provide a 4" conduit from the first floor communications room to a point 5 feet from the building's exterior wall. Coordinate stub out location with local CATV provider.

6.10.1.5 IDS: The D/B Contractor shall provide infrastructure to the Small Arms Vault for the ICIDS system. POC for the ICIDS system is Donald Butler, (804) 734-7438.

6.10.1.6 Floor outlets: In addition requirements listed under paragraph 3.8 ELECTRICAL AND TELECOMMUNICATIONS REQUIREMENTS; D/B contractor shall provide flush floor power and telecommunications outlets where the workstations are not adjacent to the wall.

6.10.1.7 Day Room, Multipurpose Room, Profile Recovery Room, and Computer Learning Room: Provide 125-volt duplex receptacles with 6-ft interval around the wall with no further than 12-ft apart and minimum of one receptacle per wall.

6.10.1.8 Provide a 125-volt duplex receptacle adjacent to each voice/data and TV outlet.

6.10.1.9 Door Status/Alarm Monitoring System

A door monitoring system consisting of a door status/alarm panel and door balanced magnetic switches shall be provided. The monitoring system shall provide door status/alarms on all doors leading into the sleeping wings and

exterior doors leading into the stairwells in order to accommodate gender segregation. System shall allow each door alarm to be individually activated or deactivated from the door status/alarm panel including resetting of doors in alarm. The door status/alarm panel that monitors all doors shall be located in the reception area near the CQ workstation. Panel shall provide both an audio and visual signal when alarm is activated.

#### 6.10.1.10 CCTV (Security Equipment Not in Contract)

The security infrastructure shall be installed to support Government furnished equipment including cameras, and motion sensors. These devices will be utilized at all doors leading into the sleeping wings and exterior doors leading into the stairwells in order to accommodate gender segregation. Infrastructure shall consist of conduit, pull wire and outlet boxes per user requirements. Conduits shall be homerun from outlet boxes for equipment connection to the CQ workstation.

#### 6.10.1.11 Sleeping Units Entry: Provide a light above medicine cabinet.

### 6.10.2 Facility Telecommunications Systems

Telecommunication systems shall be provided per Technical Criteria for Installation Information Infrastructure Architecture (I3A) based on the functional purpose of the space within the building unless specified otherwise.

All telecommunication work shall be designed and stamped by a Registered Communication Distribution Designer (RCDD).

6.10.2.1 Equipment Racks/Cabinets: Provide equipment racks and cabinets per I3A under section Equipment Racks and Equipment Cabinets sections.

6.10.2.2 Telecommunication Rooms (TR): Provide telecommunications room for sizing, location, interior finishes, electrical power outlets, telephone outlet, HVAC, and lighting per I3A under section Telecommunications Spaces.

6.10.2.3 Telecommunications Grounding: Provide grounding per I3A under section Grounding.

6.10.2.4 Computer Learning Room: In addition requirements listed under paragraph 3.8.4 Telecommunications System, D/B contractor shall provide one dual (voice and data) outlet for each occupant and with a minimum of 26 dual outlets per each Computer Learning Room.

6.10.2.5 This paragraph shall be superseded the requirements listed under paragraph 5.7.6.2:

The installers assigned to the installation of the telecommunications system or any of its components shall be regularly and professionally engaged in the business of the application, installation and testing of the specified telecommunications systems and equipment. Key personnel; i.e., supervisors and lead installers assigned to the installation of this system or any of its components shall be BICSI Registered Cabling Installers, Technician Level. Submit documentation of current BICSI certification for each of the key personnel. In lieu of BICSI certification, supervisors and installers shall have a minimum of 5 years experience in the installation of the specified copper and fiber optic cable and components. ~~They shall have or factory approved certification from each equipment manufacturer indicating that they are qualified to install and test the provided products.~~

#### 6.11. HEATING, VENTILATING, AND AIR CONDITIONING

Information included in Paragraph 6 supersedes Paragraph 5 where conflict occurs between the two paragraphs.

6.11.1 Self-contained heat pump systems shall be equipped with emergency electric heat sized to meet the capacity of the entire facility. Refrigerants used must be non-CFC.

6.11.2 HVAC equipment shall automatically start after a power outage.

6.11.3 Ventilation systems shall operate when the building is occupied. Ventilation systems for unoccupied spaces shall operate as necessary, according to building codes and standards.

6.11.4 Ventilation for acceptable indoor air quality shall be in accordance with ASHRAE 62.1. Ventilation is required for occupied spaces such as classrooms and offices and is based on the expected occupant load.

6.11.5 Shower compartments and restrooms shall have an exhaust air system, which will run continuously when occupied.

6.11.6 Connect and integrate Building level DDC control systems into current base wide UMCS system at Ft Lee.

The building level DDC control system shall be fully integrated with the base wide Ft Lee UMCS system located in building 6220 in accordance with UL 916. Ft Lee currently has Johnson Controls base-wide UMCS. The current base wide UMCS system shall fully control and monitor the new DDC control system for the complete building. The current base wide UMCS system shall be used to perform supervisory monitoring and control functions including but not limited to scheduling, alarm handling, trending, downloading memory to field devices, tree navigation, parameter change of properties, set point adjustments, configuration of operators, execution of global command, report generation plus Electrical Peak Demand Limiting and Anti-terrorist emergency shutdown in accordance with existing Fort Lee protocols. All communications between the current base wide UMCS and the new building level DDC networks shall be via the ANSI/EIA 709.1B protocol over the Fort Lee IP network in accordance with ANSI/EIA, and shall be complied with the latest UFGS section 2510 10 - Utility Monitoring and Control System (UMCS). IP network usage or construction shall be fully coordinated with the FT Lee DOIM. The Contractor shall extend the current UMCS interactive user interface and provide a graphical representation for each building level system (AHU's, fans, pumps, chillers, boilers, etc.), provide access to real-time data for building level systems, provide the ability to override points in the building level systems, and allow for access to all supervisory monitoring and control functions at the building level. Software graphics shall include color floor plans with heating and cooling zones and the display of mechanical components that reflect the type of system and zones served.

6.11.7 The controls Contractor shall submit final as-built shop drawings in a hard copy and on CD-ROM in AutoCAD format delivered to DPW Fort Lee office at building 6205.

6.11.8 The contractor shall coordinate with the Government for the exact locations of HVAC Emergency Shutoff buttons.

6.11.9 See Paragraph 6.15 Environmental and Appendix E for additional requirements.

Integrate the control system to the installation's existing UMCS. The existing UMCS is Johnson Controls

#### 6.12. ENERGY CONSERVATION

##### 6.12.1. General

Federal agencies are required by the Energy Policy Act of 2005 (P.L. 109-58), Executive Order 13423, Energy Independence and Security Act of 2007, and Federal Acquisition Regulation (FAR) Section 23.203 to incorporate the performance criteria used for ENERGY STAR®-qualified and FEMP-designated products into procurement contracts for energy consuming products and systems. Criteria for ENERGY STAR Qualified products are attached or can be viewed at: **HYPERLINK**

"[http://www.energystar.gov/index.cfm?fuseaction=find\\_a\\_product](http://www.energystar.gov/index.cfm?fuseaction=find_a_product)"[http://www.energystar.gov/index.cfm?fuseaction=find\\_a\\_product](http://www.energystar.gov/index.cfm?fuseaction=find_a_product).

Provide energy conservation in accordance with Paragraphs 4 (Applicable Criteria), 5 (General Technical Requirements), and 6 (Project Specific Requirements). In addition see Paragraphs 5.9 and 6.15.

6.12.2. Inclusion of Renewable Energy Features. The following renewable energy features have been determined lifecycle cost effective, are included in the project budget and shall be provided:

[Not Supplied - PS\_EnergyConservation : RENEWABLE\_ENERGY\_FEATURES]

### 6.13. FIRE PROTECTION

6.13.1 All fire protection and life safety features for the facilities will be in accordance with UFC 3-600-01.

6.13.2 Provide automatic fire suppression protection throughout.

6.13.3 Provide a mass notification system complying with UFC 4-021-01. Provide a Monaco compatible radio transceiver assembly for each building. All alarms shall be transmitted to the installation alarm receiving station. A mass notification system shall be fully compatible with the existing base-wide system, which currently is the Monaco Enterprises Inc., BT-XM system. The new mass notification system shall be tested at the building level after installation completed and tested again after connection to the base-wide system to insure fully functional system.

6.13.4 Fire Alarm and Detection System: Required fire alarm and detection systems shall be the addressable type. All initiation devices shall have unique addresses. Provide an annunciator panel at the main building entrance.

a) The RF Transceiver shall be compatible with the Fire Department receiving system. The RF transceiver shall be a Monaco BT-X or approved equal operating on a frequency of 138.2875 MHZ. The fire alarm receiving system is a Monaco D-21 system.

b) The information sent to the Fire Department receiving system shall be zone by zone information. All tamper devices shall be sent to the D-21 system as a supervisory tamper. All initiating devices shall be connected, Style D, to signal line circuits (SLC), Style 6. All alarm appliances shall be connected to notification appliance circuits (NAC), Style Z. A looped conduit system shall be provided so that if the conduit and all conductors within are severed at any point, all NAC and SLC will remain functional.

c) Provide photoelectric smoke detectors with 2.5% obstruction, pigtails for permanent connections, continuous power indicator light, test button, and metal base. Pull stations shall be single-action, non-glass rod type.

d) All software, software locks, special tools and any other proprietary equipment required to maintain, add devices to or delete devices from the system, or test the Fire Alarm system shall become the property of the Government and be furnished to the Contracting Officers Representative prior to the final inspection of the system.

6.13.5 Preliminary Fire Flow Test Data is provided in Appendix D.

6.13.6 Each fire department connection shall be a 5 inch Storz connection. FDC shall be located on the street side of the building with appropriate signage.

6.13.7 The contractor shall provide a fire pump for fire suppression system. Fire pump and its controllers shall be in accordance with the UFC 3-600-01 and NFPA 20.

6.13.8 The Contractor shall provide the following infrastructure and equipment to support Government Furnished Government Automatic External Defibrillators. The Contractor shall design and place AED cabinets throughout the facility so that the AED user does not travel more than 300 feet to reach the device. At a minimum, one AED cabinet shall be located on each level of the building. POC is Assistant Fire Chief Ken Pence, (804) 765-3698.

- a) Provide a 17 ½" H x 17 ½" W x 7 ¼" deep recessed AED Cabinet.
- b) Each AED cabinet shall be furnished with a tamper switch to send a supervisory signal to the fire department through the fire alarm panel alerting them when the cabinet door is opened.
- c) An 8 ½" x 11" AED PLUS wall sign.
- d) Necessary electrical and fire alarm connectivity.

#### 6.14. SUSTAINABLE DESIGN

6.14.1. LEED Rating Tool Version. This project shall be executed using LEED-NC Version 3.

6.14.2. The minimum requirement for this project is to achieve LEED Silver level. Each non-exempt facility (building plus sitework) must achieve this level. In addition to any facilities indicated as exempt in paragraph 3, the following facilities are exempt from the minimum LEED achievement requirement: Lawn Equipment Storage Building (LEB).

6.14.3. Credit Validation: LEED registration, compiling of documentation at LEED OnLine and use of the LEED Letter Templates is required. Registration and payment of registration fees will be by the Government. Administration/team management of the online project will be by the Contractor. Validation of credits will be accomplished by the Government. LEED certification of the project by the Contractor is not required. The Government may choose to seek LEED certification of the project, in which case the Government will pay certification fees and coordinate with the GBCI and the Contractor will furnish audit data as requested at no additional cost.

6.14.4. Commissioning: See Appendix M for Owner's Project Requirements document(s).

6.14.5. LEED Credits Coordination. The following information is provided relative to Sustainable Sites and other credits.

#### **SS Credit 1 Site Selection:**

Project site IS NOT considered prime farmland.

Delineation of 100-year flood elevation is shown on site drawings provided in this CONTRACT.

Delineation of threatened or endangered species habitat is shown on site drawings provided in this CONTRACT.

Delineation of water, wetlands and areas of special concern is shown on site drawings provided in this CONTRACT.

Project site WAS NOT previously used as public parkland.

#### **SS Credit 2 Development Density & Community Connectivity.**

Project site DOES NOT meets the criteria for this credit.

#### **SS Credit 3 Brownfield Redevelopment.**

Project site DOES NOT meets the criteria for this credit.

#### **SS Credit 4.1 Public Transportation Access.**

Project site DOES NOT meets the criteria for this credit.

#### **EA Credit 6 Green Power.**

35% of the project's electricity WILL NOT will be provided through an Installation renewable energy contract. Do not purchase Renewable Energy Credits (REC's) to earn this credit.

#### **MR Credit 2 Construction Waste Management.**

The Installation does not have an on-post recycling facility available for Contractor's use.

#### **Regional Priority Credits (Version 3 only)**

The project zip code is 23801.

6.14.6. LEED Credit Preferences, Guidance and Resources. See Appendix L LEED Project Credit Guidance for supplemental information relating to individual credits.

6.14.7. Not Used

6.14.8. Additional Information

Not Used

#### **6.15. ENVIRONMENTAL**

**6.15.1 BACKGROUND.** Fort Lee must meet the requirements under the Clean Air Act, the Toxic Substances Control Act, and the Asbestos School Hazard Abatement Reauthorization Act (ASHARA), as well as Army Regulations (AR) 200-1, *Environmental Protection and Enhancement*, and 420-70, *Buildings and Structures*, to minimize building occupants' exposure to asbestos dust derived from building materials. Assessment is needed to characterize the building materials prior to planned demolition activities of Building 3700.

**6.15.2 OBJECTIVE.** Current regulations require the identification and removal of asbestos, PCBs, mercury-containing materials and refrigerants prior to deconstruction. Additionally, regulations require representative sampling of building materials to determine if the demolition debris waste stream will be below the EPA TCLP standard for lead in land-filled materials. At present, there is limited asbestos information, and no PCB, mercury, or refrigerant-containing equipment information available for the subject buildings. The Contractor will conduct an assessment of the five buildings to generate data regarding the presence of asbestos and hazardous materials. The objective of this SOW is to provide technical expertise, materials, and analysis to identify hazardous materials that must be removed prior to demolition activities, thus enabling Fort Lee and the USACE to proceed with the demolition of these structures. To fulfill this objective the following tasks will be performed:

**TASK 1** – The Contractor will perform an asbestos inspection to supplement limited existing asbestos data, and suspect ACMs will be sampled at the subject building to determine if ACMs are present. Sampling of crawlspace soils will also be performed at Buildings 3700 to identify the presence of delaminated asbestos insulation debris in crawlspace soils. All asbestos samples will be analyzed by an accredited laboratory. An inspection will be performed by the Contractor to determine the presence, location and quantity of: PCB-containing items such as fluorescent light ballasts, switches, and transformers; mercury-containing thermostats and light bulbs; and refrigerant-containing equipment, such as air conditioning equipment and water coolers. No sampling of these materials will be performed. Based on the inspection and laboratory data, the ACM and hazardous materials will be quantified. One composite sample will be collected to assess the concentration of lead in building material debris that will result from the building being demolished. These samples will be analyzed by TCLP.



The major components to this task will be:

A thorough walkthrough inspection will be conducted for building 3700 to identify suspect ACM. A bulk sampling strategy will be developed to characterize any suspect materials that have not been previously evaluated. Suspect asbestos-containing thermal system insulation debris was noted on crawlspace soils at Building 3700 during a site visit conducted on 2-Feb-2010. Debris was noted on soils beneath existing pipe runs and in other locations not in the immediate vicinity of pipe runs. Given these observations, an assessment of crawlspace soils is necessary to adequately quantify the amounts of asbestos-containing debris and asbestos-contaminated soil in the crawlspace areas in Building 3700. Contractor will be responsible for developing a crawlspace sampling strategy that meets this goal, and the plan shall be subject to review and approval by the Government prior to implementation. The samples collected will be submitted to an accredited laboratory for PLM analysis. Based on laboratory data, ACM and asbestos-contaminated crawlspace soils will be quantified.

An inspection of the building will be performed to determine the quantity of PCB light ballast, mercury-containing bulbs, thermostats, and switches, and equipment containing refrigerants. Generally this will involve the dismantling of at least one light fixture of each type to determine from the labels and markings on the bulbs and ballasts if they are likely to contain PCBs or mercury. Each type of thermostat, light switch and similar components will be disassembled to determine by visual inspection if mercury was used in these items. Equipment likely to contain refrigerants will also be assessed.

Representative composite samples of building components will be collected to characterize the building materials for lead content by TCLP analysis. One sample will be collected to represent the building debris that will result from the demolition of each building. These samples will be submitted to an accredited laboratory for TCLP analysis with a 14-day sample turnaround requested.

**TASK 2** – The asbestos, PCB, mercury, refrigerant and TCLP data will be compiled and presented in tabular form. A narrative will be prepared to describe the inspection methods and procedures and to detail inspection findings that may not be clear from the tables provided. The deliverables associated with this task will be:

Asbestos summary tables will be prepared identifying the material, quantity of material, location, asbestos content, condition, and friability. The asbestos data will be presented on a per building basis.

Tables will also be prepared showing the quantity of fluorescent lights, suspect PCB light ballasts, mercury-containing fluorescent light bulbs, mercury-containing thermostats, switches, and similar items, and equipment containing refrigerants.

The TCLP lead data will be summarized in tabular form on a per building basis and will compare the sample data to the applicable EPA standard for interpretation.

A narrative accompanying the tables will be prepared to describe the sampling efforts, quantification, and data collection. The narrative will also highlight and detail any unusual findings that may not be clear from the tables provided. Any demolition activities requiring special precautions will also be discussed in the narrative.

**6.15.3 SCHEDULE OF WORK.** The Contractor will work closely with the Fort Lee Environmental Management Office (EMO) and the Corps of Engineer’s COR to ensure tasks are completed in a timely fashion. Contractor personnel will be available to participate in a kickoff meeting or kickoff conference call to address any access requirements and address any concerns from the Fort Lee EMO.

**6.15.4 REPORTS/DELIVERABLES.** The Contractor shall provide written reports compiling the data that was collected. All documents over two pages in length will be reproduced on double-sided paper containing at least the minimum percentage of recycled content required by the EPA’s Comprehensive Procurement Guidelines. The contractor will mail documents by first class mail unless otherwise directed by the COR. Electronic copies of documents will be provided to the COR in an appropriate Microsoft format. Data tables will be provided in Excel format.

<u>Deliverables</u>	<u>Quantity</u>
Final Asbestos and Hazardous Material Survey Report	3

**6.15.5 PERIOD OF PERFORMANCE.** Period of performance shall be 60 working days from the Notice to Proceed.

6.16. PERMITS

- 6.16.1 The Contractor shall be responsible for obtaining all permits (local, state, and federal) required for design and construction of all site features and utilities.
- 6.16.2 Air permitting is required for this project unless formal written confirmation from USAG-Fort Lee's DOL/DPW-EMO's Air Quality Program is received by USACE RFP Preparer or Contractor that states air permitting will not be required for the project.
- 6.16.3 Proper Storm Water Permits must be obtained from the State of Virginia. Contractor shall provide copy of Forms DCR01 and DCR199-146 and any required plans and specifications to DOL/DPW EMO for review at least 30 days prior to submission to VA DCR. Contractor shall submit this registration and any required plans and specifications to VA DCR at least 30 days prior to construction start.
- 6.16.4 For specific requirements refer to Paragraph 4 Applicable Criteria; Appendix E, Environmental Information and Appendix BB Sustainable Management of Waste.
- 6.16.5 All Military construction, renovation and demolition projects shall include contract performance requirements fo a 50% minimum diversion of construction and demolition (C&D) waste by weight from landfill disposal.

6.17. DEMOLITION

6.17.1 The Contractor shall be responsible for removal of all materials to include all hazardous and non-hazardous materials. The contractor shall procure all permits and licenses, pay all charges and fees, and give all notices necessary for lawful removal of debris. The Contractor will work closely with the Fort Lee Environmental Management Office (EMO) and the Corps of Engineer’s (COR) to ensure tasks are completed in a timely fashion. Contractor personnel will be available to participate in a kickoff meeting

or kickoff conference call to address any access requirements and address any concerns from the Fort Lee EMO. Successful proposer has the sole responsibility for identifying all hazardous materials, removing and disposing of them. The Contractor shall not begin removal of hazardous materials until authorization is received from the Contracting Officer of the date to proceed.. The work includes removal of rubbish and debris. Remove rubbish and debris from Government property daily, unless otherwise directed. Store materials that cannot be removed daily in areas specified by the Contracting Officer. Contractor shall provide Fort Lee Environmental Management Office and the Corps of Engineers a copy of all permits, licenses, and authorizations obtained by the contractor for removal and disposal of hazardous material for this contract.

### **Summary of Work**

- Demolition of site improvements adjacent to a building or structure
- Demolition and removal of all curbs, streets, parking and trash enclosures
- Removal of all underground utilities.
- Protection of all existing trees identified by Fort Lee EMO to remain.
- Remove vegetation and trees.
- Removal of above grade site improvements.
- Demolish all site concrete and asphalt.
- Clearing, grubbing for Grass Seeding.
- Soil Erosion Control Installation.
- Remove all debris from off-site.
- Security fencing for the entire site.

#### **6.17.2 REGULATORY AND SAFETY REQUIREMENTS**

The Contractor shall remove and dispose of the hazardous material in accordance with Fort Lee Environmental Management Office, State and Federal regulations, local hauling and disposal regulations, and shall indemnify and hold harmless the EMO, or COR and its representatives against any claim or liability arising from the violation of any such law, ordinance, or regulation. In addition to the requirements of the "Contract Clauses," conform to the safety requirements contained in ASSE/SAFE A10.6.

#### **6.17.3 DUST AND DEBRIS CONTROL**

Prevent the spread of dust and debris and avoid the creation of a nuisance in the surrounding area. Do not use water if it results in hazardous or objectionable conditions such as, but not limited to, ice, flooding, or pollution. Sweep pavements as often as necessary to control the spread of debris.

#### 6.17.4 PROTECTION

##### 6.17.4.1 Traffic Control Signs

Where pedestrian and driver safety is endangered in the area of removal work, use traffic barricades with flashing lights. Notify the Contracting Officer prior to beginning such work.

##### 6.17.5 Items to Remain in Place

The Contractor shall be responsible for the necessary precautions to avoid damage to existing items to remain in place, to be reused, or to remain the property of the Government. In addition to the preservation of property, trees, shrubs, monuments, etc., adjacent to the right of way on which the buildings are located and shall take every precaution to prevent damage thereto. Land monuments, property markers, and right of way markers shall not be removed by the Contractor without prior permission from Fort Lee. The Contractor shall be responsible for any and all damage done to private property due to any act, omission, neglect, or misconduct in the execution of the work, or defective work or material, and shall restore, at the Contractor's expense, by means of repairing, rebuilding, or otherwise restoring same, or shall make good on all damages to the property in a manner agreed upon by all involved parties, to a condition similar or equal to that which existed before the damage occurred. Repair or replace damaged items as approved by the Contracting Officer.

##### 6.17.6 Existing Construction Limits and Protection

Do not disturb existing construction beyond the extent indicated or necessary for installation of new construction. Construct and maintain shoring, bracing, and supports as required to prevent settlement or other movement. Ensure that structural elements are not overloaded. Increase structural supports or add new supports as may be required as a result of any cutting, removal, deconstruction, or demolition work performed under this contract. Do not overload pavements to remain. Provide new supports and reinforcement for existing construction weakened by demolition, deconstruction, or removal work. Repairs, reinforcement, or structural replacement require approval by the Contracting Officer prior to performing such work. Provide protective measures to control accumulation and migration of dust and dirt in all work areas. Remove snow, dust, dirt, and debris from work areas daily.

#### 6.17.7 FACILITIES

Protect electrical and mechanical services and utilities. Where removal of existing utilities and pavement is specified or indicated, provide approved barricades, temporary covering of exposed areas, and temporary services or connections for electrical and mechanical utilities. Floors, roofs, walls, columns, pilasters, and other structural components that are designed and constructed to stand without lateral support or shoring, and are determined to be in stable condition, must remain standing without additional bracing, shoring, or lateral support until demolished or deconstructed, unless directed otherwise by the Contracting Officer. Ensure that no elements determined to be unstable are left unsupported and place and secure bracing, shoring, or lateral supports as may be required as a result of any cutting, removal, deconstruction, or demolition work performed under this contract.

#### 6.17.8 PROTECTION OF PERSONNEL

Before, during and after the demolition work the Contractor shall continuously evaluate the site conditions and take immediate action to protect all personnel working in and around the project site.

#### 6.17.9 BURNING

The use of burning at the project site for the disposal of refuse and debris will not be permitted. Where burning is permitted, adhere to federal, state, and local regulations.

#### 6.17.10 REQUIRED DATA

Prepare a Demolition Plan. Include in the plan procedures for careful removal and disposition of materials specified to be salvaged, coordination with other work in progress, a disconnection schedule of utility services, a detailed description of methods and equipment to be used for each operation and of the sequence of operations. Coordinate with Waste Management Plan. Provide procedures for safe conduct of the work in accordance with EM 385-1-1. Plan shall be approved by Contracting Officer prior to work beginning.

#### 6.17.11 ENVIRONMENTAL PROTECTION

Comply with the Environmental Protection Agency requirements specified.

## 6.17.12 STRUCTURES

- a. Remove sidewalks, curbs, gutters and street light bases as indicated.
- b. Locate demolition and deconstruction equipment throughout the structure and remove materials so as to not impose excessive loads.

## 6.17.13 UTILITIES AND RELATED EQUIPMENT

### 6.17.13.1 General Requirements

Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by the Contracting Officer. Do not interrupt existing utilities serving facilities occupied and used by the Government except when approved in writing and then only after temporary utility services have been approved and provided. Do not begin demolition or deconstruction work until all utility disconnections have been made. Shut off and cap utilities for future use, as indicated.

### 6.17.13.2 Disconnecting Existing Utilities

Remove existing utilities, as indicated and terminate in a manner conforming to the nationally recognized code covering the specific utility and approved by the Contracting Officer. When utility lines are encountered that are not indicated on the drawings, the Contracting Officer shall be notified prior to further work in that area. Remove meters and related equipment and deliver to a location on the station in accordance with instructions of the Contracting Officer. In addition to the basic building structural materials, demolition and removal shall include, but shall not be limited to, the following: piping, wiring, plumbing, including fixtures, fencing, and any other above ground accessories which are attached to or are considered as part of the building such as steps, above ground concrete slabs, piers, or other foundation supports. Once the structures have been removed, the Contractor shall grade the area on which the structure was located in such a manner so as to provide adequate drainage and the elimination of any low areas or holes that could possibly hold water.

### 6.17.13.3 Paving and Slabs

Remove concrete and asphaltic concrete paving and slabs as indicated to a depth of 24 inches below existing adjacent grade. Pavement and slabs designated to be recycled and utilized in this project shall be

moved, ground and stored as directed by the Contracting Officer. Pavement and slabs not to be used in this project shall be removed from the Installation at Contractor's expense.

#### 6.17.13.4 Concrete

Saw concrete along straight lines to a depth of a minimum 2 inch. Make each cut in walls perpendicular to the face and in alignment with the cut in the opposite face. Break out the remainder of the concrete provided that the broken area is concealed in the finished work, and the remaining concrete is sound. At locations where the broken face cannot be concealed, grind smooth or saw cut entirely through the concrete.

#### 6.17.14 Miscellaneous Metal

Salvage shop-fabricated items such as access doors and frames, steel gratings, metal ladders, wire mesh partitions, metal railings, metal windows and similar items as whole units. Salvage light-gage and cold-formed metal framing, such as steel studs, steel trusses, metal gutters, roofing and siding, metal toilet partitions, toilet accessories and similar items. Scrap metal shall become the Contractor's property. Recycle scrap metal as part of demolition and deconstruction operations. Provide separate containers to collect scrap metal and transport to a scrap metal collection or recycling facility, in accordance with the Waste Management Plan.

#### 6.17.15 CONCURRENT EARTH-MOVING OPERATIONS

Do not begin excavation, filling, and other earth-moving operations that are sequential to demolition or deconstruction work in areas occupied by structures to be demolished or deconstructed until all demolition and deconstruction in the area has been completed and debris removed. Fill holes, open basements and other hazardous openings.

#### 6.17.16 DISPOSITION OF MATERIAL

##### 6.17.16.1 Title to Materials

Except for salvaged items specified in related Sections, and for materials or equipment scheduled for salvage, all materials and equipment removed and not reused or salvaged, shall become the property of the Contractor and shall be removed from Government property. Title to materials resulting from

demolition and deconstruction, and materials and equipment to be removed, is vested in the Contractor upon approval by the Contracting Officer of the Contractor's demolition, deconstruction, and removal procedures, and authorization by the Contracting Officer to begin demolition and deconstruction. The Government will not be responsible for the condition or loss of, or damage to, such property after contract award. Showing for sale or selling materials and equipment on site is prohibited. All nonexempt debris shall be properly disposed of in a approved and permitted disposal site or transfer facility according to Fort Lee Environmental Management Office regulations.

#### 6.17.16.2 Unsalvageable and Non-Recyclable Material

Dispose of unsalvageable and non-recyclable combustible material off the site .

#### 6.17.17 CLEANUP

Remove debris and rubbish from basement and similar excavations. Remove and transport the in a manner that prevents spillage on streets or adjacent areas. Apply local regulations regarding hauling and disposal.

#### 6.17.18 DISPOSAL OF REMOVED MATERIALS

##### 6.17.18.1 Regulation of Removed Materials

Dispose of debris, rubbish, scrap, and other nonsalvageable materials resulting from removal operations with all applicable federal, state and local regulations as contractually specified off of Government property . Storage of removed materials on the project site is prohibited.

##### 6.17.18.2 Burning on Government Property

Burning of materials removed from demolished and deconstructed structures will not be permitted on Government property.

##### 6.17.18.3 Removal to Spoil Areas on Government Property



Transport noncombustible materials removed from demolition and deconstruction structures to designated spoil areas on Government property.

#### 6.17.18.4 Removal from Government Property

Transport waste materials removed from demolished and deconstructed structures, except waste soil, from Government property for legal disposal. Dispose of waste soil as directed.

#### 6.17.19 REUSE OF SALVAGED ITEMS

The contractor shall show an attempt to recycle any salvageable materials. Diverting the construction waste from the landfill contributes to the following LEED credit: MR2 Coordinate with the section 01 74 19 Construction and Demolition Waste Management. Recondition salvaged materials and equipment shall be designated for reuse before installation. Replace items damaged during removal and salvage operations or restore them as necessary to usable condition. Items to consider:

- Concrete, steel, wood

#### 6.18. ADDITIONAL FACILITIES

Not Used.

#### 6.19 OTHER PROJECT REQUIREMENTS

##### 6.19.1 PROJECT WORK REQUIREMENTS AND RESTRICTION

##### 6.19.1.1 Hours of Work

The normal work ours for construction shall be from 0730 to 1600, Monday through Friday of each week. Any request to change these hours shall be made in writing to the Contracting Officer at least two calendar days prior to the desired day on which the change is to go into effect. The changed hours shall not go into effect until written permission has been received from the Contracting Officer.

##### 6.19.1.2 Gate Times

Sisisky Gate	0500 – 2100, seven days a week
Mahone Ave. Gate	0500 – 2100, seven days a week
Jackson Circle Gate	24 hours a day, seven days a week
A. Ave. Gate	0500 – 2100, Monday through Friday
Lee Ave. Gate	24 hours a day, seven days a week

Shop Road Gate 0500 – 2100, seven days a week (without a RapidGate pass this is the only gat that contractors can use to enter Fort Lee)

#### 6.19.1.3 Cellular Phone Use

Cellular phone use is prohibited within the construction site, except by superintendents and job foremen. Cellular phone use while driving and/or operating construction equipment is prohibited.

#### 6.19.1.4 Antiterrorism and Force Protection

Electronic Intrusion Detection System (IDS): Any IDS installed will be compatible with the current Fort Lee base-wide system, to include the current base-wide operating platform and remote monitoring work stations and will meet all Fort Lee and US Army security requirements. The IDS shall include, but no limited to, passive infrared detection, triple balanced biased magnetic switches, central on-site IDS controller which monitors, interrogates, supervises, annunciates, identifies unauthorized intrusion, electronically notifies the operating platform by use of "dry copper telephone lines" (no cellular communication) in order for the base security response to events. Contractor will coordinate all IDS issues with the user and the Physical Security Office, Ft Lee.

### 6.19.2 PROJECT SCHEDULE

Information contained within this paragraph shall supplement Section 01 32 01.00 10, providing requirements specific to Norfolk District USACE.

#### 6.19.2.1 GENERAL REQUIREMENTS

Pursuant to the Contract Clause, SCHEDULE FOR CONSTRUCTION CONTRACTS, a Project Schedule as described below shall be prepared. The NAS Project Schedule shall be a composite schedule including the design and construction activities. The scheduling of construction design and construction shall be the responsibility of the Contractor. Contractor management personnel shall actively participate in its development. Subcontractors and suppliers Designers, Subcontractors and suppliers working on the project shall also contribute in developing and maintaining an accurate Project Schedule. The approved Project Schedule shall be used

To measure the progress of the work, to aid in evaluating time extensions, and to provide the basis of all progress payments. The Government will use the NAS Project Schedule to evaluate the contractor's progress for timely completion, plan for Quality Assurance verification of the work and evaluate the effects of a proposed modification on the contract duration (critical path activities)

#### 6.19.2.2 QUALIFICATIONS- CONTRACTOR SCHEDULING REPRESENTATIVE

The Contractor shall designate, a scheduling representative, the individual tasked with the responsibility for preparation-updating-revision of the NAS schedule who shall be responsible for the preparation and submittal of the entire NAS project schedule including all items specified below and revisions to the schedule or supplemental completion schedules, as applicable or directed by the Contracting Officer. The scheduling representative shall be approved by the Contracting Officer based on a resume indicating as a minimum, formal training from software vendor or 5 years experience in working with NAS schedules.

#### 6.19.2.3 BASIS FOR PAYMENT

The schedule shall be the basis for measuring Contractor progress. Lack of an approved schedule or scheduling personnel will result in an inability of the Contracting Officer to evaluate Contractor's progress for the purposes of payment. Failure of the Contractor to provide all information, as specified below, shall result in the disapproval of the entire Project Schedule submission and the inability of the Contracting Officer to evaluate Contractor progress for payment purposes. In the case where Project Schedule revisions have been directed by the Contracting Officer and those revisions have not been included in the Project Schedule, the Contracting Officer may hold retainage up to the maximum allowed by contract, each payment period, until revisions to the Project Schedule have been made.

#### 6.19.2.4 PROJECT SCHEDULE

The contractor shall prepare the NAS schedule using a computer software system. The system utilized by the Contractor shall be capable of satisfying all requirements of this specification and ER 1-1-11. Manual methods used to produce any required information shall require prior approval by the Contracting Officer. The Contracting Officer intends to use PRIMAVERA P3. Should the contractor utilize software that is different than that utilized by the Contracting Officer, based on the software utilized by the contractor for the preparation of the NAS schedule, the

Contractor shall provide a copy of the software and a license to the Administrative Contracting Officer at the Government field office. The Contractor shall submit a copy of the user's manual outlining the selected CPM computer program's mathematical analysis capabilities, details, functions and operation. The Contractor shall provide to the Government a complete input listing for the selected software.

a) The Critical Path Method (CPM) of network calculation shall be used to generate the Project Schedule. The Contractor shall provide the Project Schedule in the Precedence Diagram Method (PDM).

b) The Project Schedule shall include an appropriate level of detail. Failure to develop or update the Project Schedule or provide data to the Contracting Officer at the appropriate level of detail, as specified by the Contracting Officer, shall result in the disapproval of the schedule. The Contracting Officer will use, but is not limited to, the following conditions to determine the appropriate level of detail to be used in the Project Schedule:

#### 1 Cost and Resource Loading

a. Cost Loading Activities: Costs for incremental design preparation will be assigned to the respective design phase submittal milestone(s). Equipment costs will be assigned to their respective Procurement Activities (i.e., the delivery milestone activity). Costs for installation of the material/equipment (labor, construction equipment, and temporary materials) will be assigned to their respective Construction Activities. The value of inspection/testing activities will not be less than 10 percent of the total costs for Procurement and Construction Activities. Evenly disperse overhead and profit to each activity over the duration of the project. The total of all cost loaded activities; including costs for material and equipment delivered for installation on the project, and labor and construction equipment loaded construction activities, shall total to 100 percent of the value of the contract.

b. Quantities and Units of Measure: Each cost loaded activity will have a detailed breakdown of the contract price, giving quantities for each of the various kinds of work, unit prices, etc.

c. Labor Resource Loading: As part of the Baseline Schedule development each construction activity shall have an estimate of the number of workers per day by trade, hours per day by trade and total expected hours used by trade during the execution of the activity. If no workers are required for an activity, then the activity shall be identified as using zero workers per day. Actual labor resource expended on an activity will be recorded in the monthly updated schedules and will coincide with entries made in the Daily Reports.

d. Equipment Resource loading: As part of the Baseline Schedule development each construction activity shall have an estimate of the equipment used per day, number of units per day and total expected hours for each piece of equipment used during the duration of the activity. Include a description of the major items of construction equipment planned for each construction activity on the project. The description shall include the year, make, model, and capacity. If no equipment is required for an activity, then the activity shall be identified as using zero equipment per day. Actual equipment resource expended on an activity will be recorded in the monthly updated schedules and will coincide with entries made in the Daily Reports.

2 Activity Durations - Contractor submissions shall follow the direction of the Contracting Officer regarding reasonable activity durations. Reasonable durations are those that allow the progress of activities to be accurately determined between payment periods (usually less than 2 percent of all non-procurement activities' Original Durations are greater than 20 days). Durations shall be in work days.

3 Design and Permit Activities - Design and permitting activities, including necessary conferences and follow-up actions and design package submission dates, shall be integrated into the schedule.

4 Procurement Activities - Tasks related to the procurement of long lead materials or equipment shall be included as separate activities in the project schedule. Long lead materials and equipment are those materials that have a procurement cycle of over 90 days. Examples of procurement process activities include, but are not limited to: submittals, approvals, procurement, fabrication, and delivery.

5 Critical Activities - The following activities shall be listed as separate line activities on the Contractor's project schedule:

- a. Submission and approval of mechanical/electrical layout drawings.
- b. Submission and approval of O & M manuals.
- c. Submission and approval of as-built drawings.
- d. Submission and approval of 1354 data and installed equipment lists.
- e. Submission and approval of testing and air balance (TAB).
- f. Submission of TAB specialist design review report.
- g. Submission and approval of fire protection specialist.
- h. Submission and approval of testing and balancing of HVAC plus commissioning plans and data.
- i. Air and water balance dates.
- j. HVAC commissioning dates.
- k. Controls testing plan.
- l. Controls testing.
- m. Performance Verification testing.
- n. Other systems testing, if required.
- o. Pre-final inspection.
- p. Correction of punch list from pre-final inspection.
- q. Final inspection.

6 Government Activities - Government and other agency activities that could impact progress shall be included in the schedule. These activities include, but are not limited to: Government approvals, Government review and verification that design submittals are in accordance with the RFP, inspections, utility tie-in, Government Furnished Equipment (GFE) and Notice to Proceed (NTP) for phasing requirements, environmental permit approvals by State regulators, inspections, Government approval of shop drawings activities should be shown with the duration at least the minimum allowed by the contract. The contractor's failure to provide reasonable durations in its schedule for Government activities does not establish or change the Government's review or approval path periods and the durations established for Government's activities are subject to approval by the Contracting Officer.

- a. Work activities to be included on the critical path
  - CQC (all) mechanical systems test (indicate the specific system)
  - CQC (all) electrical system tests (indicate the specific system)
  - Government QA (all) mechanical system acceptance/operational test (indicate specific system)
  - Government QA (all) electrical system acceptance /operational test (indicate specific system)
  - CQC completion inspection of the entire project

- Contractor works off CQC punch list
- Pre-final inspection performed when the facility is completed such that it can be used for its intended function (as determined by the Contracting Officer)
- Contractor works off pre-final punch list
- Final/acceptance inspection of the entire project
- Contractor works off final punch list.
- Contractor shall allow 30 calendar days total duration prior to current contract completion date for the above stated activities. (See Specification Section 01 45 04.00 50 CONTRACTOR QUALITY CONTROL).

b. Contracts with multiple buildings/facilities - The contractor shall prepare a separate detailed NAS schedule for each building/facility indicating its critical path for specified interim completion dates or critical milestone date. The master NAS schedule shall indicate the interface/lag/link between buildings/facilities to maximize/level the labor and other resources. The master schedule critical path must be indicated through the various buildings/facilities and total duration equal to the contract duration.

7 Responsibility - All activities shall be identified in the project schedule by the party responsible to perform the work. Responsibility includes, but is not limited to, the subcontracting firm, contractor work force, or government agency performing a given task. Activities shall not belong to more than one responsible party. The responsible party for each activity shall be identified by the Responsibility Code.

8 Work Areas - All activities shall be identified in the project schedule by the work area in which the activity occurs. Activities shall not be allowed to cover more than one work area. The work area of each activity shall be identified by the Work Area Code.

9 Modification or Claim Number - Any activity that is added or changed by contract modification or used to justify claimed time shall be identified by a mod or claim code that changed the activity. Activities shall not belong to more than one modification or claim item. The modification or claim number of each activity shall be identified by the Mod or Claim Number. Whenever possible, changes shall be added to the schedule by adding new activities. Existing activities shall not normally be changed to reflect modifications.

10 Bid Item - All activities shall be identified in the project schedule by the Bid Item to which the activity belongs. An activity shall not contain work in more than one bid item. The bid item for each appropriate activity shall be identified by the Bid Item Code.

11 Phase of Work - All activities shall be identified in the project schedule by the phases of work in which the activity occurs. Activities shall not contain work in more than one phase of work. The project phase of each activity shall be by the unique Phase of Work Code.

12 Category of Work - All Activities shall be identified in the project schedule according to the category of work which best describes the activity. Category of work refers, but is not limited, to the procurement chain of activities including such items as submittals designs, design package submissions design reviews, review conferences, permits, submittals, approvals, procurement, fabrication, delivery, installation, start-up, and testing. The category of work for each activity shall be identified by the Category of Work Code.

13 Feature of Work - All activities shall be identified in the project schedule according to the feature of work to which the activity belongs. Feature of work refers, but is not limited to, a work breakdown structure for the project. The feature of work for each activity shall be identified by the Feature of Work Code.

c) Scheduled Project Completion - The schedule duration shall extend from NTP to the official contract completion date as awarded (unless approved by Contracting Officer-for early completion).

1 Project Start Date - The schedule shall start no earlier than the date on which the NTP was acknowledged. The Contractor shall include as the first activity in the project schedule an activity called "Start Project". The "Start

Project" activity shall have an "ES" constraint date equal to the date that the NTP was acknowledged, and a zero day duration.

2 Constraint of Last Activity - Completion of the last activity in the schedule shall be constrained by the contract completion date. Calculation on project updates shall be such that if the early finish of the last activity falls after the contract completion date, then the float calculation shall reflect a negative float on the critical path. The Contractor shall include as the last activity in the project schedule an activity called "End Project". The "End Project" activity shall have an "LF" constraint date equal to the completion date for the project, and a zero day duration.

3 Early Project Completion - In the event the project schedule shows completion of the project prior to the contract completion date, the Contractor shall identify those activities that have been accelerated and/or those activities that are scheduled in parallel to support the Contractor's "early" completion. Contractor shall specifically address each of the activities noted in the narrative report at every project schedule update period to assist the Contracting Officer in evaluating the Contractor's ability to actually complete prior to the contract period. The Contractor shall include an activity named "contingency" with no cost and a duration equal to the number of calendar days from the date all the contract work is planned to be completed, to the official contract completion date as awarded.

d) Interim Completion Dates

Contractually specified interim completion dates shall also be constrained to show negative float if the early finish date of the last activity in that phase falls after the interim completion date.

1 Design phase - The contractor shall include the following design phase activities in the composite design and construction NAS Project schedule.

- a. Pre-work conference within 5 days after NTP
- b. Design Charrette (Preliminary Design) within 7 days after NTP
- c. Submittal of preliminary design (60%)
- d. Design review conference of Preliminary design Submittal of Final design (95%)
- e. Design review conference of Final design
- f. Submittal of Corrected Final design (100%)
- g. Design review conference of Corrected Final design
- h. Design Complete--- {The contracting officer shall advise the contractor in writing when the final design documents are approved for construction}
- i. The duration of each of these activities must be the duration as included in the contract award.

2 Design Network Analysis Schedule

Submit the Design Network Analysis Schedule defining the planned operations during the design phase(s) of the contract. The general (summarized) approach for the construction phase(s) of the project shall also be indicated. When the project is being Fast-Track, the Design Network Analysis Schedule shall include all fast-tracked design phases, including the required or proposed design submittals within each phase that will occur during the duration of the project. In accordance with paragraph entitled "Monthly Network Analysis Updates" the design network may be used for requesting progress payments for a period not to exceed the design phase(s) of the contract. Submittal and acceptance of the Design Network Analysis Schedule is condition precedent to the processing of the Contractor's pay requests on this schedule. The activities and relationships of the design schedule shall coincide and mesh with the activities of the Baseline NAS project Schedule. As part of this submittal, provide the Project Name format (and Project Group Name if used) that will be used by the Contractor to identify initial schedule submittals, updates, fragments, changes, etc.

3 Start Phase - The Contractor shall include as the first activity for a project phase an activity called "Start Phase X" where "X" refers to the phase of work. The "Start Phase X" activity shall have an "ES" constraint date equal to the date on which the NTP was acknowledged, and a zero day duration.

4 End Phase - The Contractor shall include as the last activity in a project phase an activity called "End Phase X" where "X" refers to the phase of work. The "End Phase X" activity shall have an "LF" constraint date equal to the completion date for the project, and a zero day duration.

5 Phase X - The Contractor shall include a hammock type activity for each project phase called "Phase X" where "X" refers to the phase of work. The "Phase X" activity shall be logically tied to the earliest and latest activities in the phase.

e) Default Progress Data Disallowed

Actual Start and Finish dates shall not be automatically updated by default mechanisms that may be included in CPM scheduling software systems. Actual Start and Finish dates on the CPM schedule shall match those dates provided from Contractor Quality Control Reports. Failure of the Contractor to document the Actual Start and Finish dates on the Daily Quality Control report for every in-progress or completed activity, and failure to ensure that the data contained on the Daily Quality Control reports is the sole basis for schedule updating shall result in the disapproval of the Contractor's schedule and the inability of the Contracting Officer to evaluate Contractor progress for payment purposes. Updating of the percent complete and the remaining duration of any activity shall be independent functions. Program features which calculate one of these parameters from the other shall be disabled.

f) Out-of-Sequence Progress

Activities that have posted progress without all preceding logic being satisfied (Out-of-Sequence Progress) will be allowed only on a case-by-case approval of the Contracting Officer. The Contractor shall propose logic corrections to eliminate all out of sequence progress or justify not changing the sequencing for approval prior to submitting an updated project schedule.

g) Negative Lags

Lag durations contained in the project schedule shall not have a negative value.

#### 6.19.2.5 PROJECT SCHEDULE SUBMISSIONS

The Contractor shall provide the submissions as described below. The data for each submission is as follows: The contractor shall provide a bar chart schedule for the first 30 calendar days of the contract at the Pre-construction conference.

a) Preliminary NAS Project Schedule Submission

The Preliminary NAS Project Schedule, defining the Contractor's planned operations for the first {90} calendar days shall be submitted for approval within 21 days after NTP. The approved preliminary schedule shall be used for payment purposes not to exceed {90} calendar days after NTP. The preliminary schedule shall be detailed for the first {90} days and depict the remainder of the project in summary format. The preliminary schedule shall be submitted on data disk or CD (2 copies).

Two hard copy of diagrams in color.

Three hard copies of all sorts / report ----earning curve----manpower plot

b) Initial NAS Project Schedule Submission

The Initial NAS Project Schedule shall be submitted for approval within 60 calendar days after NTP is acknowledged. The schedule shall include detailed activities for the entire project with a reasonable sequence of activities, and shall be at a reasonable level of detail as approved by the Contracting Officer.

The Initial schedule shall be submitted on data disk or CD (2 copies).

Two hard copy of diagrams in color.

Three hard copies of all sorts / report ----earning curve----manpower plot

c) Monthly Network Analysis Updates (Entire NAS Project Schedule)

The Contractor shall submit monthly schedule updates to the Contracting Officer for approval. Monthly updates shall continue until the contract is accepted by the Contracting Officer. These submissions shall enable the Contracting Officer to evaluate the Contractor's monthly progress.

The contractor's invoice may be deemed as an improper invoice, if it fails to provide monthly updates acceptable to Contracting Officer, this may delay progress payment and may result in an interim unsatisfactory performance rating. The contractor shall include its requests to revise/adjust the NAS schedule for approval, prior to implementing the revisions into the official schedule.

d) Review and Evaluation

After the Government's review(s) of the [Design Network Analysis Schedule](#) and Initial Network Analysis Schedule, the Contractor shall meet with the Contracting Officer to discuss the review and evaluation of the NAS submittal. Revisions necessary as a result of this review shall be resubmitted for acceptance within 10 calendar days after the meeting.

1 Acceptance - Review comments made by the Government on the Contractor's schedule(s) will not relieve the Contractor from compliance with requirements of the Contract Documents. The Contractor is responsible for scheduling, sequencing, and prosecuting the Work to comply with the requirements of the Contract Documents. Government acceptance extends only to the activities of the Contractor's schedule that the Government has been assigned responsibility for and agrees it is responsible. The Government will also review for contract imposed schedule constraints and conformance, and cost loading of the CPM activities. Comments offered on other parts of the schedule, which the Contractor is assigned responsibility, are offered as a courtesy and are not conditions of Government acceptance; but are for the general conformance with established industry schedule concepts.

a. When the Design Network Analysis Schedule is submitted and accepted by the Contracting Officer it will be considered the "Baseline Network Analysis Schedule for Design". The Design Network Analysis Schedule shall be updated at least monthly or submitted as part of the design submittals, whichever occurs first. When the Initial NAS Project Schedule is submitted and accepted by the Contracting Officer, it will then be considered the "Baseline Network Analysis Schedule". The Baseline Network Analysis Schedule will then be used by the Contractor for planning, organizing, and directing the work; reporting progress; and requesting payment for work accomplished. The schedule will be updated monthly by the Contractor and submitted monthly with the progress pay request to reflect the current status of the work. Submittal and acceptance of the Baseline Network Analysis Schedule for Design and Baseline Network Analysis Schedule and accurate updated schedules accompanying the pay requests are both conditions precedent to processing pay requests. Only bonds will be paid prior to acceptance of the Baseline Schedule(s).

b. Submittal of the Network, and subsequent schedule updates, will be understood to be the Contractor's representation that the submitted schedule meets all of the requirements of the Contract Documents, accurately reflects the work accomplished, and that Work will be executed in the sequence indicated on the submitted schedule.

2 Baseline Network Analysis Schedule - Once review comments are resolved and the Contracting Officer has accepted the Design Network Analysis Schedule and Construction Network Analysis Schedule, the Contractor shall within 5 calendar days furnish:

a. Two copies of the network diagrams.

b. Two copies of the Cash Flow S-Curve indicating the cash flow based upon both the projected early and late finish dates.

c. Two sets of data disks containing the project schedule shall be provided for the initial submission and every periodic project update. Data shall be submitted on electronic media that is acceptable to the Contracting Officer. A



permanent exterior label shall be affixed to each disk submitted. The label shall indicate the type of schedule (Design NAS, Construction NAS, Baseline, Update, Recovery, Change, etc.), full contract number, Project Name used to identify project in scheduling software, contract name & location, data status date, diskette number with total number of diskettes in set, software name and version used to run the schedule, and the name and telephone number of person responsible for the schedule. For major revisions, updates or changes to the network diagrams, once accepted by the Contracting Officer, the Contractor shall submit these same diagrams and reports.

e) Standard Activity Coding Dictionary

The Contractor shall use the activity coding structure defined in the Standard Data Exchange Format (SDEF) in ER 1-1-11, Appendix A. This exact structure is mandatory, even if some fields are not used.

6.19.2.6 SUBMISSION REQUIREMENTS

The following items shall be submitted by the Contractor for the preliminary submission, initial submission, and every periodic project schedule update throughout the life of the project:

a) Data Disks

Two data disks containing the project schedule shall be provided. Data on the disks shall adhere to the SDEF format specified in ER 1-1-11, Appendix A.

1 File Medium - The electronic files will be supplied on compact disc, read-only memory (CD-ROM) unless otherwise approved by the Contracting Officer.

2 Disk Label - A permanent exterior label shall be affixed to each disk submitted. The label shall indicate the type of schedule (Preliminary, Initial, Update, or Change), full contract number, project name, project location, data date, name and telephone number or person responsible for the schedule, and the MS-DOS version used to format the disk.

3 File Name - Each file submitted shall have a name related to either the schedule data date, project name, or contract number. The Contractor shall develop a naming convention that will ensure that the names of the files submitted are unique. The Contractor shall submit the file naming convention to the Contracting Officer for approval.

b) Narrative Report

A Narrative Report shall be provided with the preliminary, initial, and each monthly update of the project schedule. This report shall include a description of activities along the most critical paths, a description of current and anticipated problem areas or delaying factors and their impact, and an explanation of corrective actions taken or required to be taken. The narrative report is expected to relay to the Government, the Contractor's thorough analysis of the schedule output and its plans to compensate for any problems, either current or potential, which are revealed through that analysis. If the contractor believes that any Government action or inaction has, or potentially, will impact its progress, it will include the specific notice of the fact in this report. This information should include the activity number of the impacted work, nature and duration of the impact. The narrative report shall address all modifications and weather activities that were input for the progress and their impact on the contract completion and total float.

c) Approved Changes Verification

Only project schedule changes that have been previously approved by the Contracting Officer shall be included in the schedule submission. The Narrative Report shall specifically reference, on an activity by activity basis, all changes made since the previous period and relate each change to documented, approved schedule changes.

d) Schedule Reports

The format for each activity for the schedule reports listed below shall be printed for those activities in progress or completed. The report shall contain:

Activity Numbers

Activity Description

Original Duration

Remaining Duration

Early Start Date

Early Finish Date

Late Start Date

Late Finish Date

Total Float

Actual Start

Actual Finish Dates

1. Milestone Report - The established monthly and special milestones shall be included in this report. The milestones must be established for each significant project features such as: Clearing-grading-demolition, foundation, slab-on-grade, structure-frame, exterior walls-windows, roof-building dry-in, interior walls-mech/elect R/I, above ceiling mech/elect R/I, ceiling, interior wall finish--doors, painting-coverings, floor finish, installation of mech/elect and other equipment-fixtures-casework, plumbing, HVAC system, finish interior mech/elect, testing-commissioning mech/elect systems, onsite utilities, paving-landscaping, prefinal-final inspections-final cleanup and/or other features (as applicable for the project).

The milestones for a building must approximate the following

Milestone work activity    % of total duration

NTP    0%

STRUCTURE COMPLETE    36%

ROOF COMPLETE    40%

BUILDING DRY-IN    44%

INTERIOR WALLS COMPLETE 53%

PLUMBING COMPLETE    78%

FLOORING COMPLETE    80%

HVAC DUCTWORK    88%

FINISH MECH/ELECT SYSTEMS COMPLETE 91%

QC TESTING COMPLETE    92%

QA ACCEPTANCE TESTING COMPLETE    93%

CQC INSPECTION OF ENTIRE CONTRACT    95%

PREFINAL INSPECTION 97%

FINAL INSPECTION 99%

CCD 100%

#### Late Start /Late Finish Report

Late Start -Actual Start/Late Finish-Actual Finish-----total float-duration sort -----sorted by LS in chronological order from data date to contract completion date.

2 Activity Report - A list of all activities sorted according to activity number.

3 Logic Report - A list of Preceding and Succeeding activities for every activity in ascending order by activity number. Preceding and succeeding activities shall include all information listed above in paragraph Schedule Reports. A blank line shall be left between each activity grouping.

4 Total Float Report - A list of all incomplete activities sorted in ascending order of total float. Activities which have the same amount of total float shall be listed in ascending order of Early Start Dates. Completed activities shall not be shown on this report.

5 Earnings Report - A compilation of the Contractor's Total Earnings on the project from the NTP until the most recent Monthly Progress Meeting. This report shall reflect the Earnings of specific activities based on the agreements made in the field and approved between the Contractor and Contracting Officer at the most recent Monthly Progress Meeting. Provided that the Contractor has provided a complete schedule update, this report shall serve as the basis of determining Contractor Payment. Activities shall be grouped by bid item and sorted by activity numbers. This report shall: sum all activities in a bid item and provide a bid item percent; and complete and sum all bid items to provide a total project percent complete. The printed report shall contain, for each activity: the Activity Number, Activity Description, Original Budgeted Amount, Total Quantity, Quantity to Date, Percent Complete (based on cost), and Earnings to Date.

#### e) Network Diagram

One hard copy of the network diagram shall be required on the preliminary schedule, initial schedule submission, and updated on each monthly schedule submissions. Monthly updates must indicate actual progress as of the data date. The network diagram shall depict and display the order and interdependence of activities and the sequence in which the work is to be accomplished.

Network diagrams shall show the order and interdependence of project activities and the sequence in which the work is to be accomplished, as planned by the Contractor. The network diagramming procedure which will be used will show how the start of a given activity is dependent on the completion of preceding activities, and how its completion restricts the start of following activities.

Activity Duration: The activity duration shall be indicated in "work" days, and revise the assigned calendar.

The contractor may request to change the work days from 5 days/week to 6 or 7 days/week should this action become necessary to regain the schedule due to problems unrelated to the Government actions.

Contractor submissions shall include reasonable activity durations as determined by the contractor and subcontractors. The durations are to be determined by the contractor using the planned crew size/composition.

The network diagram shall be required on the initial schedule submission and on monthly schedule update submissions. The network diagram shall depict and display the order and interdependence of activities and the sequence in which the work is to be accomplished. The Contracting Officer will use, but is not limited to, the following conditions to review compliance with this paragraph:

1 Continuous Flow - Diagrams shall show a continuous flow from left to right with no arrows from right to left. The activity number, description, duration, and estimated earned value shall be shown on the diagram.

- 2 Project Milestone Dates - Dates shall be shown on the diagram for start of project, any contract required interim completion dates, and contract completion dates.
- 3 Critical Path - The critical path shall be clearly shown.
- 4 Banding - Activities shall be grouped to assist in the understanding of the activity sequence. Typically, this flow will group activities by category of work, work area and/or responsibility.
- 5 Earning (S-Curves) - Earnings (cash flow) curves (as required for submissions) shall show scheduled ES/EF and LS/LF curves. The monthly updates must indicate the actual progress plotted as of the data date. The cash flow curves are affected by the assigned cost and duration of the activities. The LS/LF cash flow curve is expected approximate 40% earning (without stored material) @ 50% of the contract duration and 70% earning @ 70% of contract duration. Earnings curves showing projected early and late earnings and earnings to date.

#### 6.19.2.7 PERIODIC PROGRESS MEETINGS

- a) There will be two progress meetings for the review and updating of the project scheduling.

A progress update meeting will be held at the onsite between USACE and the authorized contractor representatives, on the agreed cut-off date established at the pre-construction conference. During this meeting the Contractor shall indicate its requested percentage completed on each activity on which there was a revised percentage of completion. The Contracting Officer must approve actual progress percentages for each Progress meetings to discuss payment shall include a monthly onsite meeting or other regular intervals mutually agreed to at the pre-construction conference. During this meeting the Contractor shall describe, on an activity-by-activity basis, all proposed revisions and adjustments to the project schedule required to reflect the current status of the project. The Contracting Officer will approve activity progress, proposed revisions, and adjustments as appropriate.

- b) The updated progress data will be evaluated at the second progress meeting.

A progress evaluation meeting shall be held with the contractor, after the updating of the current progress period work activities percentage is complete including modifications and adverse weather activities, to evaluate progress and the NAS schedule.

Adjustments to the NAS schedule. Update information must include the Actual Start Dates, Actual Finish Dates, Remaining Durations, and Cost to Date. The Contractor must address all the activities on an activity-by-activity basis during the second progress meeting.

The monthly updated NAS schedule is submitted to the Contracting Officer, for approval, with the contractor's request for progress payment. The evaluation will include a review of actual durations compared to scheduled durations for critical and non-critical activities, progress on critical activities and near critical activities, trends, and current/potential problem areas, cash flow progress, and projected workflow of activities.

The contractor's narrative report shall be available for review at least three days prior to the second progress meeting.

- c) Meeting Attendance

The Contractor's Project Manager and Scheduler shall attend the regular progress meeting.

- d) Update Submission Following Progress Meeting

A complete update of the project schedule containing all approved progress, revisions, and adjustments, based on the regular progress meeting, shall be submitted not later than 4 working days after the monthly progress meeting.

- e) Progress Meeting Contents

Update information, including Actual Start Dates, Actual Finish Dates, Remaining Durations, and Cost-to-Date shall be subject to the approval of the Contracting Officer. As a minimum, the Contractor shall address the following items on an activity by activity basis during each progress meeting.

- 1 Start and Finish Dates - The Actual Start and Actual Finish dates for each activity currently in-progress or completed.
- 2 Time Completion - The estimated Remaining Duration for each activity in-progress. Time-based progress calculations shall be based on Remaining Duration for each activity.
- 3 Cost Completion - The earnings for each activity started. Payment will be based on earnings for each in-progress or completed activity. Payment for individual activities will not be made for work that contains quality defects. A portion of the overall project amount may be retained based on delays of activities.
- 4 Logic Changes - All logic changes pertaining to NTP on change orders, change orders to be incorporated into the schedule, contractor proposed changes in work sequence, corrections to schedule logic for out-of-sequence progress, lag durations, and other changes that have been made pursuant to contract provisions shall be specifically identified and discussed.
- 5 Other Changes - Other changes required due to delays in completion of any activity or group of activities include:
  - a. Delays beyond the Contractor's control, such as strikes and unusual weather.
  - b. Delays encountered due to submittals, Government Activities, deliveries or work stoppages which make re-planning the work necessary.
  - c. Changes required to correct a schedule which does not represent the actual or planned prosecution and progress of the work.

#### 6.19.2.8 REQUESTS FOR TIME EXTENSIONS

In the event the Contractor requests a time extension of the contract completion date, or any interim milestone date, the Contractor shall furnish the following for a determination as to whether or not the Contractor is entitled to an extension of time under the provisions of the contract: justification, project schedule data, and supporting evidence as the Contracting Officer may deem necessary. Submission of proof of delay shall be based on a subnet/fragnet of work activities, revised activity logic, duration, and costs (updated to the specific date that the delay occurred) is required for any time extension approvals. The project schedule shall clearly display that the Contractor has used, in full, all the float time available for the work involved with this request. Actual delays that are found to be caused by the Contractor's own actions, which result in the extension of the schedule, shall not be a cause for a time extension to the contract completion date.

##### a) Justification of Delay

The project schedule shall clearly display that the Contractor has used, in full, all the float time available for the work involved with this request. The Contracting Officer's determination as to the number of allowable days of contract extension shall be based upon the project schedule updates in effect for the time period in question, and other factual information. Actual delays that are found to be caused by the Contractor's own actions, which result in the extension of the schedule, will not be a cause for a time extension to the contract completion date.

##### b) Submission Requirements for Time Extension Requests

The Contractor shall submit a comprehensive time analysis and justification for each "Request for Proposal" for a change in the contract, based upon the most recent approved schedule update at the time of the RFP issued. Such a time analysis and justification shall be in accordance with the requirements of other appropriate Contract Clauses and shall include, as a minimum:

1. A subnet/fragnet of activities indicating all new change activities and the affect on existing schedule activities.
2. A brief explanation of the causes of the change.

3. An analysis of the overall impact the subnet/fragnet has when applied to the current-updated approved NAS schedule.
4. Activities impacted in each justification for change shall be identified by a unique activity code contained in the required data file.
5. Modifications to the contract
6. Unpriced, unilateral and bilateral (without agreement on time) modifications

Upon receipt of the signed SF 30, for un-priced and unilateral modifications (or bilateral modifications with agreement on costs without an agreement on time, the Contractor shall submit proposed schedule revisions (in the form of a proposed subnet/fragnet) to the Contracting Officer for approval, within 14 days of the SF 30 being issued. The proposed (subnet/fragnet) revisions to the schedule will be approved by the Contracting Officer prior to application of those changes within the project schedule.

Should the contractor fail or refuse to submit the provisions, the Contracting Officer may furnish the Contractor suggested (subnet/fragnet) revisions to the project schedule.

Upon receipt, the Contractor shall include these subnet/fragnet revisions in the project schedule.

If the Contractor has any objections to the revisions furnished by the Contracting Officer, the Contractor shall advise the Contracting Officer within 14 days of receipt of the revisions.

Regardless of the objections, the Contractor shall continue to update the schedule with the Contracting Officer's revisions until a mutual agreement on the revisions is reached.

If the Contractor fails to submit alternative revisions within 2 weeks of receipt of the Contracting officer's proposed revisions, the contractor will be deemed to have concurred with the Contracting Officer's proposed revisions. The proposed revisions will be the basis for an "equitable adjustment" for performance of the work.

Bilateral modifications shall be entered into the NAS schedule, utilizing the subnet/fragnet as agreed during negotiations, immediately after receipt of signed SF 30. Entries to the schedule must be approved by Contracting Officer.

All modifications subnets/fragnets shall be applied to the NAS schedule immediately in the sequence in which they were finalized (received signed SF 30). The modification with time extension shall result in new work activities entered adjacent to the critical path work activity affected by the modification.

Weather time extensions must be included monthly upon receipt of the written results of the monthly weather evaluation from the Contracting Officer.

c) Contractor falls behind the approved project schedule

If the Contractor falls behind its approved schedule, (behind the LS/LF cash flow curve or more than 10 work days of negative float) or performs the work in such a manner that the network diagram and mathematical analysis no longer indicate reasonable logic and duration for completion of the work by the current contract completion date, as determined by the Contracting Officer, the Contractor shall promptly provide a supplemental NAS recovery or completion schedule for completion by the current completion date, by reducing the remaining durations, revising logic, or adjusting resources onsite (in addition to the original approved NAS schedule) as approved by the Contracting Officer. The supplemental schedule shall be resource loaded with crew size and productivity for each remaining activity, and indicating overtime, weekend work, double shifts needed to regain the schedule, in accordance with FAR 52.236-15, without additional cost to the Government. The supplement schedule shall not replace the original approved schedule as the official contract schedule. The original approved schedule shall be updated monthly (in addition to the supplemental schedule) and monitored by the contractor and the Contracting Officer to determine the effect of the supplemental schedule progress has on the contract progress to regain its rate of progress for timely completion as specified.

The Contractor shall not artificially improve its progress by revising the schedule logic restraints or shortening future work activity durations. The contractor may improve its progress by performing sequential work activities concurrently or by performing activities more quickly than planned, but such improvements shall be indicated on a supplement schedule and shall not be recorded on the official until they have actually been achieved by the contractor. The additional resources required to improve the progress must be evident on the work site.

Failure of the contractor to perform work and maintain progress in accordance with the supplemental recovery or completion schedule may result in an interim and final unsatisfactory performance rating and/or may result in corrective action by the contracting officer in accordance with FAR 52.236-15.

The Contractor shall submit a justification for each request for a change in the contract completion date of less than 2 weeks based upon the most recent schedule update at the time of the NTP or constructive direction issued for the change. Such a request shall be in accordance with the requirements of other appropriate Contract Clauses and shall include, as a minimum:

1. A list of affected activities, with their associated project schedule activity number.
2. A brief explanation of the causes of the change.
3. An analysis of the overall impact of the changes proposed.
4. A sub-network of the affected area.

Activities impacted in each justification for change shall be identified by a unique activity code contained in the required data file.

d) Additional Submission Requirements

For any requested time extension of over 2 weeks, the Contracting Officer may request an interim update with revised activities for a specific change request. The Contractor shall provide this disk within 4 days of the Contracting Officer's request.

#### 6.19.2.9 DIRECTED CHANGES

If the NTP is issued for changes prior to settlement of price and/or time, the Contractor shall submit proposed schedule revisions to the Contracting Officer within 2 weeks of the NTP being issued. The proposed revisions to the schedule will be approved by the Contracting Officer prior to inclusion of those changes within the project schedule. If the Contractor fails to submit the proposed revisions, the Contracting Officer may furnish the Contractor with suggested revisions to the project schedule. The Contractor shall include these revisions in the project schedule until revisions are submitted and final changes and impacts have been negotiated. If the Contractor has any objections to the revisions furnished by the Contracting Officer, the Contractor shall advise the Contracting Officer within 2 weeks of receipt of the revisions. Regardless of the objections, the Contractor shall continue to update the schedule with the Contracting Officer's revisions until a mutual agreement in the revisions is reached. If the Contractor fails to submit alternative revisions within 2 weeks of receipt of the Contracting Officer's proposed revisions, the Contractor will be deemed to have concurred with the Contracting Officer's proposed revisions. The proposed revisions will then be the basis for an equitable adjustment for performance of the work.

#### 6.19.2.10 OWNERSHIP OF FLOAT

Float available in the schedule, at any time, shall not be considered for the exclusive use of either the Government or the Contractor.

#### 6.19.3 SUPPLEMENTAL SUBMITTAL PROCEDURES

The following are submittals and submittal procedures to supplement those described in Section 01.33.00.

##### 6.19.3.1 Submittal Descriptions (SD)

##### SD-01 Preconstruction Submittals

- Activity Hazard Analysis (AHA)
- Design Network Analysis Schedule
- Crane Critical Lift Plan

#### 6.19.3.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SC-01 preconstruction Submittals

Submittal register; G

#### 6.19.3.3 GOVERNMENT REVIEW SCHEDULING

Submittals covering component items forming a system or items that are interrelated shall be scheduled to be coordinated and submitted concurrently. Certifications to be submitted with the pertinent drawings shall be so scheduled. Adequate time (a minimum of 30 calendar days exclusive of mailing time) shall be allowed and shown on the register for review and approval. No delay damages or time extensions will be allowed for time lost in late submittals.

##### a) Pre-Construction Submittal Scheduling

Pre-Construction submittals shall be scheduled and shown on the submittal register to allow a minimum of 30 calendar days (exclusive of mailing time) for review and approval. No delay damages or time extensions will be allowed for time lost in late submittals.

##### b) Design Submittal Scheduling

Design submittals shall be submitted in accordance with the requirements of Section 01 33.16 "Design After Award".

#### 6.19.3.4 SUBMITTAL PROCEDURES (Refer to Paragraph 1.11)

Submittals shall be made as follows:

##### a) Procedures

1. The Contractor shall be responsible for the scheduling and control of all submittals. The Contractor is responsible for confirming that the submittal register includes all submittals required by the contract documents.
2. In addition to those items listed on ENG Form 4288, the Contractor will furnish submittals for any deviation from the plans or specifications. The scheduled need dates must be recorded on the document for each item for control purposes and critical items must be tied to the Contractor's approved schedule where applicable.
3. The Contractor will submit to the Contracting Officer for approval a minimum of five copies of all G/RE (Resident/Area Office Review), G/ED (Engineering Division Review) or G/AE (Architect-Engineer Review) level submittals. Three copies of all FIO level submittals will be provided. The number of copies of submittals specified in this portion of the contract shall be complied with in lieu of four copies as specified by FAR 52.236-21.
4. For those contracts requiring Network Analysis System (NAS), the Contractor will schedule on the NAS critical items of equipment submittals and procurement activities which will, or have the potential to, significantly impact project completion. The inclusion or exclusion of critical items shall be subject to the approval of the Contracting Officer. Where ENG Form 4025 must be submitted prior to approval of the Construction Progress Schedule, the Contractor shall submit an initial annotated ENG Form 4288 upon which dates for submittal, approval and delivery of procurement items shall be included for the first 60 days of the work. Upon approval of the



Construction Progress Schedule, or no later than 60 days after Notice to Proceed, the Contractor shall submit final annotated copies of ENG Form 4288. Dates shall be coordinated with the approved Construction Progress Schedule to logically interface with the sequence of construction. Critical item numbers will be shown on the listing if NAS is required.

5. Furnishing the schedule shall not be interpreted as relieving the Contractor of his obligation to comply with all the specification requirements for the items on the schedule. Contractor's Quality Control representative shall review the listing at least every 30 days and take appropriate action to maintain an effective system. The Contractor shall furnish a list each 30 days of all submittals on which either Government's or Contractor's action is past due. He shall also furnish revised due dates in those cases when the original submittal schedule is no longer realistic. This monthly list of delayed items shall also be annotated by the Contractor to show what corrective action he is taking with regard to slippages in submittal schedule which are attributable to actions by him, his subcontractors, or suppliers.

6. The Contractor shall provide a complete updated submittal register indicating the current status of all submittals when requested by the Contracting Officer in order to assure himself the schedule is being maintained.

7. The Contractor shall certify that each submittal is correct and in strict conformance with the contract drawings and specifications. All submittals not subject to the approval of the Contracting Officer will be submitted for information purposes only.

8. No Corps of Engineers action will be required prior to incorporating these items into the work, but the submittal shall be furnished to the Area/Resident Engineer not less than 2 weeks prior to procurement of Contractor certified material, equipment, etc.

9. These Contractor approved submittals will be used to verify that material received and used in the job is the same as that described and approved and will be used as record copies. All samples of materials submitted as required by these specifications shall be properly identified and labeled for ready identification, and upon being certified by the Contractor and reviewed by the Contracting Officer, shall be stored at the site of the work for job site use until all work has been completed and accepted by the Contracting Officer. Delegation of this approval authority to Contractor Quality Control does not relieve the Contractor from the obligation to conform to any contract requirement and will not prevent the Contracting Officer from requiring removal and replacement of construction not in contract conformance; nor does it relieve the Contractor from the requirement to furnish "samples" for testing by the Government Laboratory or check testing by the Government in those instances where the technical specifications so prescribe.

10. Contractor certified drawings will be subject to quality assurance review by the Government at any time during the duration of the contract. No adjustment for time or money will be allowed for corrections required as a result of noncompliance with plans and specifications.

11. Submittals Requiring Government Approval (G/ED Level, G/RE Level or G/AE level). Where the review authority is designated to the Government, the Contractor is required to sign the certification on ENG Form 4025 in the box beside the remarks block in Section I. The Government will code the items in block h and sign the approval action block in Section II as the approving authority.

12. Operating and Maintenance Instructions. Six complete sets of instructions containing the manufacturer's operating and maintenance instructions for each piece of equipment shall be furnished. Each set shall be permanently bound and shall have a hard cover. One complete set shall be furnished at the time test procedures are submitted. Remaining sets shall be furnished before the contract is completed. The following identification shall be inscribed on the covers: The words "OPERATING AND MAINTENANCE INSTRUCTIONS," name and location of the facility, name of the Contractor, and contract number. Fly sheets shall be placed before instructions covering each subject. Instruction sheets shall be approximately 8-1/2 by 11 inches, with large sheets of drawings folded in. Instructions shall include but are not limited to:

- a. System layout showing piping, valves and controls;
- b. Approved wiring and control diagrams;
- c. A control sequence describing startup, operation and shutdown;

- d. Operating and maintenance instructions for each piece of equipment, including lubrication instructions and troubleshooting guide; and
  - e. Manufacturer's bulletins, cuts and descriptive data; parts lists and recommended parts.
13. The Government will further discuss and detail the required submittal procedures at the Pre-Construction Conference.
14. If the Government performs a conformance review of other Designer of Record approved submittals, the submittals will be so identified and returned, as described above.
15. For design-build construction the Government will retain 2 copies of information only submittals.

#### 6.19.4 SAFETY AND OCCUPATIONAL HEALTH REQUIREMENTS

##### 6.19.4.1 GENERAL

###### a) REFERENCES

Refer to APPLICABLE CRITERIA in Paragraph 4.

###### b) SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

Government acceptance is required for submittals with a "G, A" designation.

##### SD-01 Preconstruction Submittals

Accident Prevention Plan (APP); G, A

Activity Hazard Analysis (AHA); G, A

Crane Critical Lift Plan; G, A

Proof of qualification for Crane Operators; G, A

##### SD-06 Test Reports

###### Reports

Submit reports as their incidence occurs, in accordance with the requirements of the paragraph entitled, "Reports."

Accident Reports

Monthly Exposure Reports

Crane Reports

Regulatory Citations and Violations

##### SD-07 Certificates

Confined Space Entry Permit

Hot work permit

Certificate of Compliance (Crane)

Submit one copy of each permit/certificate attached to each Daily Quality Control Report.

c) DEFINITIONS

1. High Visibility Accident. Any mishap which may generate publicity and/or high visibility.
2. Medical Treatment. Treatment administered by a physician or by registered professional personnel under the standing orders of a physician. Medical treatment does not include first aid treatment even though provided by a physician or registered personnel.
3. Recordable Injuries or Illnesses. Any work-related injury or illness that results in:
  - a. Death, regardless of the time between the injury and death, or the length of the illness;
  - b. Days away from work (any time lost after day of injury/illness onset);
  - c. Restricted work;
  - d. Transfer to another job;
  - e. Medical treatment beyond first aid;
  - f. Loss of consciousness; or
  - g. A significant injury or illness diagnosed by a physician or other licensed health care professional, even if it did not result in (1) through (6) above.
4. "USACE" property and equipment specified in USACE EM 385-1-1 should be interpreted as Government property and equipment.

6.19.4.2 REGULATORY REQUIREMENTS

In addition to the detailed requirements included in the provisions of this contract, work performed shall comply with USACE EM 385-1-1, and the following federal, state, and local, laws, ordinances, criteria, rules and regulations. Submit matters of interpretation of standards to the appropriate administrative agency for resolution before starting work. Where the requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements shall apply.

6.19.4.3 SITE QUALIFICATIONS, DUTIES AND MEETINGS

a) Personnel Qualifications

1. Site Safety and Health Officer (SSHO): Site Safety and Health Officer (SSHO) shall be provided at the work site at all times to perform safety and occupational health management, surveillance, inspections, and safety enforcement for the Contractor. The Contractor Quality Control (QC) person cannot be the SSHO on this project, even though the QC has safety inspection responsibilities as part of the QC duties. The SSHO shall meet the following requirements:

Level 3:

A minimum of 5 years safety work on similar projects.

30-hour OSHA construction safety class or equivalent within the last 5 years.

An average of at least 24 hours of formal safety training each year for the past 5 years.

Competent person training as needed.

2. Crane Operators: Crane operators shall meet the requirements in USACE EM 385-1-1, Section 16 and Appendix G. In addition, for mobile cranes with Original Equipment Manufacturer (OEM) rated capacities of 50,000 pounds or greater, crane operators shall be designated as qualified by a source that qualifies crane operators (i.e., union, a government agency, or an organization that tests and qualifies crane operators). Proof of current qualification shall be provided.

b) Personnel Duties

1. Site Safety and Health Officer (SSHO)/Superintendent

a. Conduct daily safety and health inspections and maintain a written log which includes area/operation inspected, date of inspection, identified hazards, recommended corrective actions, estimated and actual dates of corrections. Safety inspection logs shall be attached to the Contractors' daily quality control report.

b. Conduct mishap investigations and complete required reports. Maintain the OSHA Form 300 and Daily Production reports for prime and sub-contractors.

c. Maintain applicable safety reference material on the job site.

d. Attend the pre-construction conference, pre-work meetings including preparatory inspection meeting, and periodic in-progress meetings.

e. Implement and enforce accepted APPS and AHAs.

f. Maintain a safety and health deficiency tracking system that monitors outstanding deficiencies until resolution. A list of unresolved safety and health deficiencies shall be posted on the safety bulletin board.

g. Ensure sub-contractor compliance with safety and health requirements.

2. Failure to perform the above duties will result in dismissal of the superintendent and/or SSHO, and a project work stoppage. The project work stoppage will remain in effect pending approval of a suitable replacement.

c) Meetings

Preconstruction Conference

1. Contractor representatives who have a responsibility or significant role in accident prevention on the project shall attend the preconstruction conference. This includes the project superintendent, site safety and health officer, quality control supervisor, or any other assigned safety and health professionals who participated in the development of the APP (including the Activity Hazard Analyses (AHAs) and special plans, program and procedures associated with it).

2. The Contractor shall discuss the details of the submitted APP to include incorporated plans, programs, procedures and a listing of anticipated AHAs that will be developed and implemented during the performance of the contract. This list of proposed AHAs will be reviewed at the conference and an agreement will be reached between the Contractor and the Contracting Officer's representative as to which phases will require an analysis. In addition, a schedule for the preparation, submittal, review, and acceptance of AHAs shall be established to preclude project delays.

3. Deficiencies in the submitted APP will be brought to the attention of the Contractor at the preconstruction conference, and the Contractor shall revise the plan to correct deficiencies and re-submit it for acceptance. Work shall not begin until there is an accepted APP.

4. The functions of a Preconstruction conference may take place at the Post-Award Kickoff meeting for Design Build Contracts.

1. ACCIDENT PREVENTION PLAN (APP)

- a. The Contractor shall use a qualified person to prepare the written site-specific APP. Prepare the APP in accordance with the format and requirements of USACE EM 385-1-1 and as supplemented herein. Cover all paragraph and subparagraph elements in USACE EM 385-1-1, Appendix A, "Minimum Basic Outline for Accident Prevention Plan". Specific requirements for some of the APP elements are described below. The APP shall be job-specific and shall address any unusual or unique aspects of the project or activity for which it is written. The APP shall interface with the Contractor's overall safety and health program. Any portions of the Contractor's overall safety and health program referenced in the APP shall be included in the applicable APP element and made site-specific. The Government considers the Prime Contractor to be the "controlling authority" for all work site safety and health of the subcontractors. Contractors are responsible for informing their subcontractors of the safety provisions under the terms of the contract and the penalties for noncompliance, coordinating the work to prevent one craft from interfering with or creating hazardous working conditions for other crafts, and inspecting subcontractor operations to ensure that accident prevention responsibilities are being carried out. The APP shall be signed by the person and firm (senior person) preparing the APP, the Contractor, the on-site superintendent, the designated site safety and health officer and any designated CSP and/or CIH.
- b. Submit the APP to the Contracting Officer 15calendar days prior to the date of the preconstruction conference for acceptance. Work cannot proceed without an accepted APP.
- c. Once accepted by the Contracting Officer, the APP and attachments will be enforced as part of the contract. Disregarding the provisions of this contract or the accepted APP will be cause for stopping of work, at the discretion of the Contracting Officer, until the matter has been rectified.
- d. Once work begins, changes to the accepted APP shall be made with the knowledge and concurrence of the Contracting Officer, project superintendent, SSHO and quality control manager. Should any hazard become evident, stop work in the area, secure the area, and develop a plan to remove the hazard. Notify the Contracting Officer within 24 hours of discovery. Eliminate/remove the hazard. In the interim, all necessary action shall be taken to restore and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public (as defined by ANSI/ASSE A10.34,) and the environment.
- e. Copies of the accepted plan will be maintained at the resident engineer's office and at the job site.
- f. The APP shall be continuously reviewed and amended, as necessary, throughout the life of the contract. Unusual or high-hazard activities not identified in the original APP shall be incorporated in the plan as they are discovered.

#### 6.19.4.4 ACTIVITY HAZARD ANALYSIS (AHA)

- a) The Activity Hazard Analysis (AHA) format shall be in accordance with USACE EM 385-1-1. Submit the AHA for review at least 15 calendar days prior to the start of each phase. Format subsequent AHAs as amendments to the APP. The analysis should be used during daily inspections to ensure the implementation and effectiveness of the activity's safety and health controls.
- b) The AHA list will be reviewed periodically (at least monthly) at the Contractor supervisory safety meeting and updated as necessary when procedures, scheduling, or hazards change.
- c) The activity hazard analyses shall be developed using the project schedule as the basis for the activities performed. Any activities listed on the project schedule will require an AHA. The AHAs will be developed by the contractor, supplier or subcontractor and provided to the prime contractor for submittal to the Contracting Officer.

#### 6.19.4.5 DISPLAY OF SAFETY INFORMATION

Within 1 calendar days after commencement of work, erect a safety bulletin board at the job site. The safety bulletin board shall include information and be maintained as required by EM 385-1-1, section 01.A.06.

#### 6.19.4.6 SITE SAFETY REFERENCE MATERIAL

Maintain safety-related references applicable to the project, including those listed in the article "References." Maintain applicable equipment manufacturer's manuals.

#### 6.19.4.7 EMERGENCY MEDICAL TREATMENT

Contractors will arrange for their own emergency medical treatment. Government has no responsibility to provide emergency medical treatment.

#### 6.19.4.8 REPORTS

- a) Accident Reports - For recordable injuries and illnesses, and property damage accidents resulting in at least \$2,000 in damages, the Prime Contractor shall conduct an accident investigation to establish the root cause(s) of the accident, complete the USACE Accident Report Form 3394 and provide the report to the Contracting Officer within 5 calendar day(s) of the accident. The Contracting Officer will provide copies of any required or special forms.
- b) Accident Notification - Notify the Contracting Officer as soon as practical, but not later than four hours, after any accident meeting the definition of Recordable Injuries or Illnesses or High Visibility Accidents, property damage equal to or greater than \$2,000, or any weight handling equipment accident. Information shall include contractor name; contract title; type of contract; name of activity, installation or location where accident occurred; date and time of accident; names of personnel injured; extent of property damage, if any; extent of injury, if known, and brief description of accident (to include type of construction equipment used, PPE used, etc.). Preserve the conditions and evidence on the accident site until the Government investigation team arrives on-site and Government investigation is conducted.
- c) Monthly Exposure Reports - Monthly exposure reporting to the Contracting Officer is required to be attached to the monthly billing request. This report is a compilation of employee-hours worked each month for all site workers, both prime and subcontractor. The Contracting Officer will provide copies of any special forms.
- d) Crane Reports - Submit crane inspection reports required in accordance with USACE EM 385-1-1, Appendix H and as specified herein with Daily Reports of Inspections.
- e) Certificate of Compliance - The Contractor shall provide a Certificate of Compliance for each crane entering an activity under this contract (see Contracting Officer for a blank certificate). Certificate shall state that the crane and rigging gear meet applicable OSHA regulations (with the Contractor citing which OSHA regulations are applicable, e.g., cranes used in construction, demolition, or maintenance shall comply with 29 CFR 1926 and USACE EM 385-1-1 section 16 and Appendix H. Certify on the Certificate of Compliance that the crane operator(s) is qualified and trained in the operation of the crane to be used. The Contractor shall also certify that all of its crane operators working on the DOD activity have been trained in the proper use of all safety devices (e.g., anti-two block devices). These certifications shall be posted on the crane.

#### 6.19.4.9 HOT WORK

- a) Prior to performing "Hot Work" (welding, cutting, etc.) or operating other flame-producing/spark producing devices, a written permit shall be requested from the Fire Division. CONTRACTORS ARE REQUIRED TO MEET ALL CRITERIA BEFORE A PERMIT IS ISSUED. The Contractor will provide at least two (2) twenty (20) pound 4A:20 BC rated extinguishers for normal "Hot Work". All extinguishers shall be current inspection tagged, approved safety pin and tamper resistant seal. It is also mandatory to have a designated FIRE WATCH for any "Hot Work" done at this activity. The Fire Watch shall be trained in accordance with NFPA 51B and remain on-site for a minimum of 30 minutes after completion of the task or as specified on the hot work permit.
- b) When starting work in the facility, Contractors shall require their personnel to familiarize themselves with the location of the nearest fire alarm boxes and place in memory the emergency Fire Division phone number. ANY FIRE, NO MATTER HOW SMALL, SHALL BE REPORTED TO THE RESPONSIBLE FIRE DIVISION IMMEDIATELY.

#### 6.19.4.10 CONSTRUCTION AND/OR OTHER WORK

- a) Hazardous Material Exclusions - Notwithstanding any other hazardous material used in this contract, radioactive materials or instruments capable of producing ionizing/non-ionizing radiation (with the exception of radioactive material and devices used in accordance with USACE EM 385-1-1 such as nuclear density meters for compaction testing and laboratory equipment with radioactive sources) as well as materials which contain

asbestos, mercury or polychlorinated biphenyls, di-isocyanates, lead-based paint are prohibited. The Contracting Officer, upon written request by the Contractor, may consider exceptions to the use of any of the above excluded materials.

b) Unforeseen Hazardous Material - If material, not indicated, that may be hazardous to human health upon disturbance during construction operations is encountered, stop that portion of work and notify the Contracting Officer immediately. Within 14 calendar days the Government will determine if the material is hazardous. If material is not hazardous or poses no danger, the Government will direct the Contractor to proceed without change. If material is hazardous and handling of the material is necessary to accomplish the work, the Government will issue a modification pursuant to "FAR 52.243-4, Changes" and "FAR 52.236-2, Differing Site Conditions."

#### 6.19.4.11 PRE-OUTAGE COORDINATION MEETING

Contractors are required to apply for utility outages at least 15 days in advance. As a minimum, the request should include the location of the outage, utilities being affected, duration of outage and any necessary sketches. Special requirements for electrical outage requests are contained elsewhere in this specification section. Once approved, and prior to beginning work on the utility system requiring shut down, the Contractor shall attend a pre-outage coordination meeting with the Contracting Officer and the Public Utilities representative to review the scope of work and the lock-out/tag-out procedures for worker protection. No work will be performed on energized electrical circuits unless proof is provided that no other means exist.

#### 6.19.4.12 FALL HAZARD PROTECTION AND PREVENTION PROGRAM

The Contractor shall establish a fall protection and prevention program, for the protection of all employees exposed to fall hazards. The program shall include company policy; identify responsibilities, education and training requirements, fall hazard identification, prevention and control measures, inspection, storage, care and maintenance of fall protection equipment and rescue and evacuation procedures.

1. Training - The Contractor shall institute a fall protection training program. As part of the Fall Hazard Protection and Prevention Program, the Contractor shall provide training for each employee who might be exposed to fall hazards. A competent person for fall protection shall provide the training. Training requirements shall be in accordance with USACE EM 385-1-1, section 21.A.16.

2. Fall Protection Equipment and Systems - The Contractor shall enforce use of the fall protection equipment and systems designated for each specific work activity in the Fall Protection and Prevention Plan and/or AHA at all times when an employee is exposed to a fall hazard. Employees shall be protected from fall hazards as specified in EM 385-1-1, section 21. In addition to the required fall protection systems, safety skiff, personal floatation devices, life rings etc., are required when working above or next to water in accordance with USACE EM 385-1-1, paragraphs 05.H. and 05.I. Personal fall arrest systems are required when working from an articulating or extendible boom, swing stages, or suspended platform. In addition, personal fall arrest systems are required when operating other equipment such as scissor lifts if the work platform is capable of being positioned outside the wheelbase. The need for tying-off in such equipment is to prevent ejection of the employee from the equipment during raising, lowering, or travel. Fall protection must comply with 29 CFR 1926.500, Subpart M, USACE EM 385-1-1 and ANSI A10.32.

Personal Fall Arrest Equipment - Personal fall arrest equipment, systems, subsystems, and components shall meet ANSI Z359.1. Only a full-body harness with a shock-absorbing lanyard or self-retracting lanyard is an acceptable personal fall arrest body support device. Body belts may only be used as a positioning device system (for uses such as steel reinforcing assembly and in addition to an approved fall arrest system). Harnesses shall have a fall arrest attachment affixed to the body support (usually a Dorsal D-ring) and specifically designated for attachment to the rest of the system. Only locking snap hooks and carabiners shall be used. Webbing, straps, and ropes shall be made of synthetic fiber. The maximum free fall distance when using fall arrest equipment shall not exceed 1.8 m (6 feet). The total fall distance and any swinging of the worker (pendulum-like motion) that can occur during a fall shall always be taken into consideration when attaching a person to a fall arrest system.

3. Fall Protection for Roofing Work - Fall protection controls shall be implemented based on the type of roof being constructed and work being performed. The roof area to be accessed shall be evaluated for its structural integrity including weight-bearing capabilities for the projected loading.

a. Low Sloped Roofs:

- (1) For work within 6 feet of an edge, on low-slope roofs, personnel shall be protected from falling by use of personal fall arrest systems, guardrails, or safety nets.
- (2) For work greater than 6 feet from an edge, warning lines shall be erected and installed in accordance with 29 CFR 1926.500 and USACE EM 385-1-1.

b. Steep-Sloped Roofs: Work on steep-sloped roofs requires a personal fall arrest system, guardrails with toe-boards, or safety nets. This requirement also includes residential or housing type construction.

4. Existing Anchorage - Existing anchorages, to be used for attachment of personal fall arrest equipment, shall be certified (or re-certified) by a qualified person for fall protection in accordance with ANSI Z359.1. Existing horizontal lifeline anchorages shall be certified (or re-certified) by a registered professional engineer with experience in designing horizontal lifeline systems.
5. Horizontal Lifelines - Horizontal lifelines shall be designed, installed, certified and used under the supervision of a qualified person for fall protection as part of a complete fall arrest system which maintains a safety factor of 2 (29 CFR 1926.500).
6. Guardrails and Safety Nets - Guardrails and safety nets shall be designed, installed and used in accordance with EM 385-1-1 and 29 CFR 1926 Subpart M.
7. Rescue and Evacuation Procedures - When personal fall arrest systems are used, the contractor must ensure that the mishap victim can self-rescue or can be rescued promptly should a fall occur. A Rescue and Evacuation Plan shall be prepared by the contractor and include a detailed discussion of the following: methods of rescue; methods of self-rescue; equipment used; training requirement; specialized training for the rescuers; procedures for requesting rescue and medical assistance; and transportation routes to a medical facility. The Rescue and Evacuation Plan shall be included in the Activity Hazard Analysis (AHA) for the phase of work, in the Fall Protection and Prevention (FP&P) Plan, and the Accident Prevention Plan (APP).

6.19.4.13 EQUIPMENT

a) Material Handling Equipment -

1. Material handling equipment such as forklifts shall not be modified with work platform attachments for supporting employees unless specifically delineated in the manufacturer's printed operating instructions.
2. The use of hooks on equipment for lifting of material must be in accordance with manufacturer's printed instructions.
3. Operators of forklifts or power industrial trucks shall be licensed in accordance with OSHA.

b) Weight Handling Equipment

1. Cranes and derricks shall be equipped as specified in EM 385-1-1, section 16.
2. The Contractor shall comply with the crane manufacturer's specifications and limitations for erection and operation of cranes and hoists used in support of the work. Erection shall be performed under the supervision of a designated person (as defined in ASME B30.5). All testing shall be performed in accordance with the manufacturer's recommended procedures.
3. The Contractor shall comply with ASME B30.5 for mobile and locomotive cranes, ASME B30.22 for articulating boom cranes, ASME B30.3 for construction tower cranes, and ASME B30.8 for floating cranes and floating derricks.
4. Under no circumstance shall a Contractor make a lift at or above 90% of the cranes rated capacity in any configuration.



5. When operating in the vicinity of overhead transmission lines, operators and riggers shall be alert to this special hazard and shall follow the requirements of USACE EM 385-1-1 section 11 and ASME B30.5 or ASME B30.22 as applicable.
6. Crane suspended personnel work platforms (baskets) shall not be used unless the Contractor proves that using any other access to the work location would provide a greater hazard to the workers or is impossible. Personnel shall not be lifted with a line hoist or friction crane.
7. Portable fire extinguishers shall be inspected, maintained, and recharged as specified in NFPA 10, Standard for Portable Fire Extinguishers.
8. All employees shall be kept clear of loads about to be lifted and of suspended loads.
9. The Contractor shall use cribbing when performing lifts on outriggers.
10. The crane hook/block must be positioned directly over the load. Side loading of the crane is prohibited.
11. A physical barricade must be positioned to prevent personnel from entering the counterweight swing (tail swing) area of the crane.
12. Certification records which include the date of inspection, signature of the person performing the inspection, and the serial number or other identifier of the crane that was inspected shall always be available for review by Contracting Officer personnel.
13. Written reports listing the load test procedures used along with any repairs or alterations performed on the crane shall be available for review by Contracting Officer personnel.
14. Certify that all crane operators have been trained in proper use of all safety devices (e.g. anti-two block devices).

#### 6.19.4.14 EXCAVATIONS

The competent person shall perform soil classification in accordance with 29 CFR 1926.

- a) Utility Locations - Prior to digging, the appropriate digging permit must be obtained. All underground utilities in the work area must be positively identified by a private utility locating service in addition to any station locating service and coordinated with the station utility department. Any markings made during the utility investigation must be maintained throughout the contract.
- b) Utility Location Verification - The Contractor must physically verify underground utility locations by hand digging using wood or fiberglass handled tools when any adjacent construction work is expected to come within three feet of the underground system. Digging within 2 feet of a known utility must not be performed by means of mechanical equipment; hand digging shall be used. If construction is parallel to an existing utility the utility shall be exposed by hand digging every 100 feet if parallel within 5 feet of the excavation.
- c) Shoring Systems - Trench and shoring systems must be identified in the accepted safety plan and AHA. Manufacturer tabulated data and specifications or registered engineer tabulated data for shoring or benching systems shall be readily available on-site for review. Job-made shoring or shielding shall have the registered professional engineer stamp, specifications, and tabulated data. Extreme care must be used when excavating near direct burial electric underground cables.
- d) Trenching Machinery - Trenching machines with digging chain drives shall be operated only when the spotters/laborers are in plain view of the operator. Operator and spotters/laborers shall be provided training on the hazards of the digging chain drives with emphasis on the distance that needs to be maintained when the digging chain is operating. Documentation of the training shall be kept on file at the project site.

#### 6.19.4.15 UTILITIES WITHIN CONCRETE SLAB/ELECTRICAL

Utilities located within concrete slabs or pier structures, bridges, and the like, are extremely difficult to identify due to the reinforcing steel used in the construction of these structures. Whenever contract work involves concrete chipping, saw cutting, or core drilling, the existing utility location must be coordinated with station utility departments in addition to a private locating service. Outages to isolate utility systems shall be used in circumstances where utilities are unable to be positively identified. The use of historical drawings does not alleviate the contractor from meeting this requirement.

#### 6.19.4.16 ELECTRICAL

a) Conduct of Electrical Work - Underground electrical spaces must be certified safe for entry before entering to conduct work. Cables that will be cut must be positively identified and de-energized prior to performing each cut. Positive cable identification must be made prior to submitting any outage request for electrical systems. Arrangements are to be coordinated with the Contracting Officer and Station Utilities for identification. The Contracting Officer will not accept an outage request until the Contractor satisfactorily documents that the circuits have been clearly identified. Perform all high voltage cable cutting remotely using hydraulic cutting tool. When racking in or live switching of circuit breakers, no additional person other than the switch operator will be allowed in the space during the actual operation. Plan so that work near energized parts is minimized to the fullest extent possible. Use of electrical outages clear of any energized electrical sources is the preferred method. When working in energized substations, only qualified electrical workers shall be permitted to enter. When work requires Contractor to work near energized circuits as defined by the NFPA 70, high voltage personnel must use personal protective equipment that includes, as a minimum, electrical hard hat, safety shoes, insulating gloves with leather protective sleeves, fire retarding shirts, coveralls, face shields, and safety glasses. In addition, provide electrical arc flash protection for personnel as required by NFPA 70E. Insulating blankets, hearing protection, and switching suits may also be required, depending on the specific job and as delineated in the Contractor's AHA.

b) Portable Extension Cords - Portable extension cords shall be sized in accordance with manufacturer ratings for the tool to be powered and protected from damage. All damaged extension cords shall be immediately removed from service. Portable extension cords shall meet the requirements of NFPA 70.

#### 6.19.4.17 WORK IN CONFINED SPACES

The Contractor shall comply with the requirements in Section 06.I of USACE EM 385-1-1, OSHA 29 CFR 1910.146 and OSHA 29 CFR 1926.21(b)(6). Any potential for a hazard in the confined space requires a permit system to be used.

#### 6.19.5 TEMPORARY CONSTRUCTION FACILITIES

##### 6.19.5.1 GENERAL

The following are Temporary Construction Facilities to supplement those described in Section 01.50 02.

Refer to APPLICABLE CRITERIA in Paragraph 4.

##### 6.19.5.2 IDENTIFICATION OF EMPLOYEES

The Contractor shall be responsible for furnishing to each employee, and for requiring each employee engaged on the work to display, identification as approved and directed by the Contracting Officer. Prescribed identification shall immediately be delivered to the Contracting Officer for cancellation upon release of any employee. When required, the Contractor shall obtain and provide fingerprints of persons employed on the project. Contractor and subcontractor personnel shall wear identifying markings on hard hats clearly identifying the company for whom the employee works.

##### 6.19.5.3 AVAILABILITY AND USE OF UTILITY SERVICES

###### a) Payment for Utility Services

The Government will make all reasonably required utilities available to the Contractor from existing outlets and supplies, as specified in the contract. Unless otherwise provided in the contract, the amount of each utility service consumed shall be charged to or paid for by the Contractor at prevailing rates charged to the Government or,

where the utility is produced by the Government, at reasonable rates determined by the Contracting Officer. The Contractor shall carefully conserve any utilities furnished without charge.

b) Meters and Temporary Connections

The Contractor is responsible for obtaining all meters and temporary connections for temporary facilities or temporary use. Utilities on Ft. Lee, including electric, water; sewer, telephone, and cable are operated by privatized utility companies. The Contractor shall coordinate all required temporary connections and/or metering for electric, water, and sewer with the Ft. Lee Directorate of Logistics/Directorate of Public Works (DOL/DPW) and set up accounts for payment of utility usage with DOL/DPW. The POC for this action is Ms. Arlene Day. The Contractor shall be required to contact the local telephone provider and local cable provider directly and coordinate and pay for all services required.

c) Sanitation

The Contractor shall provide and maintain within the construction area minimum field-type sanitary facilities approved by the Contracting Officer. Government toilet facilities will not be available to Contractor's personnel.

d) Telephone

The Contractor shall make arrangements and pay all costs for telephone facilities desired.

6.19.5.4 BULLETIN BOARD, PROJECT SIGN, AND PROJECT SAFETY SIGN

a) Bulletin Board

Immediately upon beginning of work, the Contractor shall provide a weatherproof glass-covered bulletin board not less than **36 by 48 inches** in size for displaying the Equal Employment Opportunity poster, a copy of the wage decision contained in the contract, Wage Rate Information poster, and other information approved by the Contracting Officer. The bulletin board shall be located at the project site in a conspicuous place easily accessible to all employees, as approved by the Contracting Officer. Legible copies of the aforementioned data shall be displayed until work is completed. Upon completion of work the bulletin board shall be removed by and remain the property of the Contractor.

b) Project and Safety Signs

The requirements for the signs, their content, and location shall be provided at a location designated by the Contracting Officer. The signs shall be erected within 15 days after receipt of the Notice to Proceed. The data required by the safety sign shall be corrected daily, with light colored metallic or non-metallic numerals. Upon completion of the project, the signs shall be removed and disposed of by the Contractor.

1. Project Identification Signs shall be in accordance with standards EP310-1-6a. See Appendix FF for sign details.
2. Safety Sign - The safety sign shall conform to the requirements as indicated on Figure 2. The data required by the sign shall be corrected daily, with light colored metallic or non-metallic numerals. Numerals, including mounting hardware, shall be subject to the approval of the CO.
3. Sign Erection - The project sign shall be erected to conform to the requirements as indicated on Figure 1 in Appendix FF.

6.19.5.5 PROTECTION AND MAINTENANCE OF TRAFFIC

a) During construction the Contractor shall provide access and temporary relocated roads as necessary to maintain traffic. The Contractor shall maintain and protect traffic on all affected roads during the construction period except as otherwise specifically directed by the Contracting Officer. Measures for the protection and diversion of traffic, including the provision of watchmen and flagmen, erection of barricades, placing of lights around and in front of equipment and the work, and the erection and maintenance of adequate warning, danger, and direction signs, shall be as required by the State and local authorities having jurisdiction. The traveling public shall be protected

from damage to person and property. The Contractor's traffic on roads selected for hauling material to and the site shall interfere as little as possible with public traffic. The Contractor shall investigate the adequacy of existing roads and the allowable load limit on these roads. The Contractor shall be responsible for the repair of any damage to roads caused by construction operations.

b) Barricades: The Contractor shall erect and maintain temporary barricades to limit public access to hazardous areas. Such barricades shall be required whenever safe public access to paved areas such as roads, parking areas or sidewalks is prevented by construction activities or as otherwise necessary to ensure the safety of both pedestrian and vehicular traffic. Barricades shall be securely placed, clearly visible with adequate illumination to provide sufficient visual warning of the hazard during both day and night.

#### 6.19.5.6 CONTRACTOR'S TEMPORARY FACILITIES

##### a) Administrative Field Offices

The Contractor shall provide and maintain administrative field office facilities within the construction area at the designated site. Government office and warehouse facilities will not be available to the Contractor's personnel.

##### b) Project Area

The Contractor shall construct a temporary 6 foot high chain link fence around trailers and materials. The fence shall include plastic strip inserts, colored green, so that visibility through the fence is obstructed. Fence posts may be driven, in lieu of concrete bases, where soil conditions permit. Trailers, materials, or equipment shall not be placed or stored outside the fenced area unless such trailers, materials, or equipment are assigned a separate and distinct storage area by the Contracting Officer away from the vicinity of the construction site but within the military boundaries. Trailers, equipment, or materials shall not be open to public view with the exception of those items which are in support of ongoing work on any given day. Materials shall not be stockpiled outside the fence in preparation for the next day's work. Mobile equipment, such as tractors, wheeled lifting equipment, cranes, trucks, and like equipment, shall be parked within the fenced area at the end of each work day.

##### c) Supplemental Storage Area

Upon Contractor's request, the Contracting Officer will designate another or supplemental area for the Contractor's use and storage of trailers, equipment, and materials. This area may not be in close proximity of the construction site but shall be within the military boundaries. Fencing of materials or equipment will not be required at this site; however, the Contractor shall be responsible for cleanliness and orderliness of the area used and for the security of any material or equipment stored in this area. Utilities will not be provided to this area by the Government.

##### d) Appearance of Trailers

Trailers utilized by the Contractor for administrative or material storage purposes shall present a clean and neat exterior appearance and shall be in a state of good repair. Trailers which, in the opinion of the Contracting Officer, require exterior painting or maintenance will not be allowed on the military property.

##### e) Maintenance of Project Area

Fencing shall be kept in a state of good repair and proper alignment. Should the Contractor elect to traverse, with construction equipment or other vehicles, grassed or unpaved areas which are not established roadways, such areas shall be covered with a layer of gravel as necessary to prevent rutting and the tracking of mud onto paved or established roadways; gravel gradation shall be at the Contractor's discretion. Grass located within the boundaries of the construction site shall be mowed for the duration of the project. Grass and vegetation along fences, buildings, under trailers, and in areas not accessible to mowers shall be edged or trimmed neatly.

##### f) Security Provisions

Adequate outside security lighting shall be provided at the Contractor's temporary facilities. The Contractor shall be responsible for the security of its own equipment; in addition, the Contractor shall notify the appropriate law enforcement agency requesting periodic security checks of the temporary project field office.

#### 6.19.5.7 GOVERNMENT FIELD OFFICE

Not Used.

#### 6.19.5.8 PLANT COMMUNICATION

Whenever the Contractor has the individual elements of its plant so located that operation by normal voice between these elements is not satisfactory, the Contractor shall install a satisfactory means of communication, such as telephone or other suitable devices. The devices shall be made available for use by Government personnel.

#### 6.19.5.9 TEMPORARY PROJECT SAFETY FENCING

As soon as practicable, but not later than 15 days after the date established for commencement of work, the Contractor shall furnish and erect temporary project safety fencing at the work site. The safety fencing shall be a high visibility orange colored, high density polyethylene grid or approved equal, a minimum of 42 inches high, supported and tightly secured to steel posts located on maximum 10 foot centers, constructed at the approved location. The safety fencing shall be maintained by the Contractor during the life of the contract and, upon completion and acceptance of the work, shall become the property of the Contractor and shall be removed from the work site.

#### 6.19.5.10 CLEANUP

Construction debris, waste materials, packaging material and the like shall be removed from the work site daily. Any dirt or mud which is tracked onto paved or surfaced roadways shall be cleaned away. Materials resulting from demolition activities which are salvageable shall be stored within the fenced area described above or at the supplemental storage area. Stored material not in trailers, whether new or salvaged, shall be neatly stacked when stored.

#### 6.19.5.11 RESTORATION OF STORAGE AREA

Upon completion of the project and after removal of trailers, materials, and equipment from within the fenced area, the fence shall be removed and will become the property of the Contractor. Areas used by the Contractor for the storage of equipment or material, or other use, shall be restored to the original or better condition. Gravel used to traverse grassed areas shall be removed and the area restored to its original condition, including top soil and seeding as necessary.

### 6.19.6 CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

#### 6.19.6.1 GOVERNMENT POLICY

Government policy is to apply sound environmental principles in the design, construction and use of facilities. As part of the implementation of that policy the Contractor shall: (1) practice efficient waste management when sizing, cutting, and installing products and materials and (2) use all reasonable means to divert construction and demolition waste from landfills and incinerators and to facilitate their recycling or reuse.

#### 6.19.6.2 MANAGEMENT

The Contractor shall take a pro-active, responsible role in the management of construction and demolition waste and require all subcontractors, vendors, and suppliers to participate in the effort. Construction and demolition waste includes products of demolition or removal, excess or unusable construction materials, packaging materials for construction products, and other materials generated during the construction process but not incorporated into the work. In the management of waste consideration shall be given to the availability of viable markets, the condition of the material, the ability to provide the material in suitable condition and in a quantity acceptable to available markets, and time constraints imposed by internal project completion mandates. The Contractor shall be responsible for implementation of any special programs involving rebates or similar incentives related to recycling of waste. Revenues or other savings obtained for salvage, or recycling shall accrue to the Contractor. Firms and facilities used for recycling, reuse, and disposal shall be appropriately permitted for the intended use to the extent required by federal, state, and local regulations.

### 6.19.6.3 CONSTRUCTION AND DEMOLITION (C&D) WASTE MANAGEMENT PLAN

A waste management plan shall be submitted within 15 days after notice to proceed and prior to initiating any site preparation work. At a minimum, the plan shall include the contractor's plan(s) for a minimum fifty percent (50%) diversion rate or justification for less than a fifty percent (50%) rate due to time and/or cost constraints as identified below. The plan shall include the following:

- a. Name of individuals on the Contractor's staff responsible for waste prevention and management.
- b. Actions that will be taken to reduce solid waste generation.
- c. Description of the specific approaches to be used in recycling/reuse of the various materials generated, including the areas and equipment to be used for processing, sorting, and temporary storage of wastes.
- d. Characterization, including estimated types and quantities, of the waste to be generated.
- e. Name of landfill and/or incinerator to be used and the estimated costs for use, assuming that there would be no salvage or recycling on the project.
- f. Identification of local and regional reuse programs, including non-profit organizations such as schools, local housing agencies, and organizations that accept used materials such as materials exchange networks and Habitat for Humanity.
- g. List of specific waste materials that will be salvaged for resale, salvaged and reused, or recycled. Recycling facilities that will be used shall be identified.
- h. Identification of materials that cannot be recycled/reused with an explanation or justification.
- i. Anticipated net cost savings determined by subtracting Contractor program management costs and the cost of disposal from the revenue generated by sale of the materials and the incineration and/or landfill cost avoidance.

The contractor shall notify the Contracting Officer if diversion activities will cause the project duration time to be exceeded. Along with the notification, the contractor shall provide the highest diversion rate that can be obtained based on the project schedule. If it is determined by the Government that the project is mission-critical, the diversion rate may be amended.

If the cost of achieving the fifty percent (50%) minimum diversion rate is significantly greater than the cost of conventional demolition methods and the risk can be attributed directly to meeting the minimum diversion rate, the contractor shall immediately notify the Contracting Officer for a determination on whether a lower diversion rate is acceptable. If the Contracting Officer determines that a lower diversion rate is acceptable, the rate may be amended to the highest obtainable rate that can be met as agreed upon by all parties.

### 6.19.6.4 RECORDS

Records shall be maintained to document the quantity of waste generated; the quantity of waste diverted through sale, reuse, or recycling; and the quantity of waste disposed by landfill or incineration. In addition to the reporting criteria contain herein, the Contractor shall refer to Appendix E - FORT LEE ENVIRONMENTAL SPECIAL CONDITIONS for specific reporting requirements. The records shall be made available to the Contracting Officer during construction, and a copy of the records shall be delivered to the Contracting Officer upon completion of the construction. Throughout the duration of the contract, contractor shall maintain and make available to the Contracting Officer, records, to include all weight tickets, documenting the quantity of waste generated, the quantity of waste diverted from a landfill or incineration and the quantity of waste disposed by landfill or incineration. Upon contract completion, the contractor shall submit a copy of all records with a statement certifying that at least fifty percent (50%) of C&D waste has been diverted from landfill disposal to the Installation EMO.

### 6.19.6.5 COLLECTION

The necessary containers, bins and storage areas to facilitate effective waste management shall be provided and shall be clearly and appropriately identified. Recyclable materials shall be handled to prevent contamination of materials from incompatible products and materials and separated by one of the following methods:

a) Source Separated Method.

Waste products and materials that are recyclable shall be separated from trash and sorted into appropriately marked separate containers and then transported to the respective recycling facility for further processing.

b) Co-Mingled Method.

Waste products and recyclable materials shall be placed into a single container and then transported to a recycling facility where the recyclable materials are sorted and processed.

c) Other Methods.

Other methods proposed by the Contractor may be used when approved by the Contracting Officer.

#### 6.19.6.6 DISPOSAL

Except as otherwise specified in other sections of the specifications, disposal shall be in accordance with the following:

a) Reuse.

First consideration shall be given to salvage for reuse since little or no re-processing is necessary for this method, and less pollution is created when items are reused in their original form. Sale or donation of waste suitable for reuse shall be considered. Salvaged materials, other than those specified in other sections to be salvaged and reinstalled, shall not be used in this project.

b) Recycle.

Waste materials not suitable for reuse, but having value as being recyclable, shall be made available for recycling whenever economically feasible.

c) Waste.

Materials with no practical use or economic benefit shall be disposed at a landfill or incinerator.

#### 6.19.7 STRUCTURAL INTERIOR DESIGN (SID) REQUIREMENTS

##### 6.19.7.5 GENERAL INFORMATION

Structural Interior Design includes all building related elements and components generally part of the building itself, such as wall finishes, ceilings finishes, floor coverings, marker/bulletin boards, blinds, signage and built in casework. The SID should be developed in conjunction with the furniture footprint.

##### 6.19.7.6 STRUCTURAL INTERIOR DESIGN (SID) REQUIREMENTS FOR THE INTERIM AND FINAL DESIGN SUBMITTALS

a) FORMAT AND SCHEDULE

1. Prepare and submit for approval an interior and exterior building finishes scheme for an interim design submittal. The DOR shall meet with and discuss the finish schemes with the appropriate Government officials prior to preparation of the schemes to be presented. Present original sets of the schemes to reviewers at an interim design conference.

2. At the conclusion of the interim phase, after resolutions to the comments have been agreed upon between DOR and Government reviewers, the DB Contractor may proceed to final design with the interior finishes scheme presented.
3. The SID information and samples are to be submitted in 8 1/2" x 11" format using three ring binders with pockets on the inside of the cover. When there are numerous pages with thick samples, use more than one binder. Large D-ring binders are preferred to O-ring binders. Use page protectors that are strong enough to keep pages from tearing out. Anchor large or heavy samples with mechanical fasteners, Velcro, or double-faced foam tape rather than rubber cement or glue. Fold out items must have a maximum spread of 25 1/2". Provide cover and spine inserts sheets identifying the document as "Structural Interior Design" package and include the project title and location, project number, Contractor/A/E name and phone number(s), submittal stage and date.
4. The design submittal requirements will include, but are not limited to:
  - a. Narrative of the Structural Interior Design Objectives - The SID shall include a narrative that discusses the building related finishes. Include topics that relate to base standards, life safety, sustainable design issues, aesthetics, durability and maintainability, discuss the development and features as they relate to the occupants requirements and the building design.
  - b. Interior Color Boards - Each item on the color boards shall be identified and keyed to the contract documents to provide a clear indication of how and where each item will be used. To the maximum extent possible, finish samples shall be arranged by room type in order to illustrate room color coordination. All samples shall be labeled on the color boards with the manufacturer's name, patterns and colors name and number. Samples shall also be keyed or coded to match key code system used on contract drawings.
  - c. Material and finish samples shall indicate true pattern, color and texture. Photographs or colored photocopies of materials or fabrics to show large overall patterns are required in conjunction with actual samples to show the actual colors. Finish samples must be large enough to show a complete pattern or design where practical.
  - d. Interior Color boards shall include but not be limited to original color samples of the following:
    - i. All walls finishes, ceiling finishes, including information regarding tile patterns.
    - ii. All flooring finishes, including information regarding tile patterns.
    - iii. All signage, wall base, toilet partitions, operable/folding partitions and trim
    - iv. All millwork materials and finishes (cabinets, counter tops, etc.)
    - v. All window treatments (sills, blinds, etc.)
  - e. Exterior Color Boards - Prepare exterior finishes color boards in similar format as the interior finishes color boards, for presentation to the reviewers during an interim design conference. The exterior finishes boards shall include original color samples of all exterior finishes including but not limited to the following:
    - i. All Roof Finishes
    - ii. All Brick and cast stone Samples
    - iii. All Exterior Insulation and Finish Samples
    - iv. All Glass Color Samples
    - v. All Exterior Metals Finishes
    - vi. All Window & Door Frame Finishes
    - vii. All Specialty Item Finishes, including trim



viii. Identify each item on the exterior finishes color boards and key to the building elevations to provide a clear indication of how and where each item will be used.

f. Color board samples shall reflect all actual finish textures, patterns and colors required as specified. Patterned samples shall be of sufficient size to adequately show pattern and its repeat if a repeat occurs.

b) STRUCTURAL INTERIOR DESIGN DOCUMENTS

1. General - Structural interior design related drawings must indicate the placement of extents of SID material, finishes and colors and must be sufficiently detailed to define all interior work. The following is a list of minimum requirements:

2. Finish Color Schedule - Provide finish color schedule(s) in the contract documents. Provide a finish code, material type, manufacturer, series, and color designations.

3. Interior Finish Plans - Indicate wall and floor patterns and color placement, material transitions and extents of interior finishes.

4. Furniture Footprint Plans - Provide furniture footprint plans showing the outline of all freestanding and systems furniture for coordination of all other disciplines.

5. Interior Signage - Include interior signage plans or schedules showing location and quantities of all interior signage. Key each interior sign to a quantitative list indicating size, quantity of each type and signage text.

6. Interior Elevations, Sections and Details - Interior Elevations, Sections and Details: Indicate material, color and finish placement.

6.19.8 FURNITURE, FIXTURES & EQUIPMENT (FF&E) REQUIREMENTS

6.19.8.1 GENERAL INFORMATION

a) FF&E is the selection, layout, specification and documentation of furniture includes but is not limited to workstations, seating, tables, storage and shelving, filing, trash receptacles, clocks, framed artwork, artificial plants, and other accessories. Contract documentation is required to facilitate pricing, procurement and installation. The FF&E package is based on the furniture footprint developed in the SID portion of the interior design. The FF&E package shall be developed concurrently with the building design to ensure that there is coordination between the furniture design, the electrical, IT and other building requirements.

b) The DOR shall interview Government personnel to determine FF&E requirements for furniture and furnishings. Determine FF&E items and quantities by, but not limited to: (1) the number of personnel to occupy the building, (2) job functions and related furniture/office equipment to support the job function, (3) room functions, (4) rank and grade.

c) Lastly, for all designs provided regardless of facility type, the DOR shall make every effort to implement all aspects of sustainability to the greatest extent possible for all the selections made in the FF&E package. This includes but is not limited to the selection of products that consider: Material Chemistry and Safety of Inputs (What chemicals are used in the construction of the selections?); Recyclability (Do the selections contain recycled content?); Disassembly (Can the selections be disassembled at the end of their useful life to recycle their materials?).

d) The DOR is encouraged to make selections to the greatest extent possible of products that possess McDonough Braungart Design Chemistry (HYPERLINK "<http://www.mbdc.com>" [MBDC](http://www.mbdc.com)) certification or other "third-party" certified Cradle to Cradle program, Forest Stewardship Council (FSC) certification, GREENGAURD certification or similar "third-party" certified products consisting of low-emitting materials.

6.19.8.2 FF&E REQUIREMENTS FOR THE INTERIM AND FINAL DESIGN SUBMITTALS

a) FORMAT AND SCHEDULE

1. Prepare and submit for approval a comprehensive FF&E scheme for an interim design submittal. The DOR shall meet with and discuss the FF&E scheme with the appropriate Government representatives prior to preparation of the scheme to be presented to discuss the intent of the overall design with regard to all the aspects of the FF&E design listed in paragraph 2.1.1 Narrative of Interior Design Objectives below. Then, present original sets of the scheme to reviewers at an interim design conference in conjunction with the interim architectural design or three months prior to the submittal of the final FF&E package (whichever comes first).
2. At the conclusion of the interim phase, after resolutions to the comments have been agreed upon between DOR and Government reviewers, the DB Contractor may proceed to final design with the FF&E scheme presented.
3. A complete and final FF&E package must be submitted to the Government in conjunction with the 100% architectural design submittal or ten months prior to the contract completion date (whichever comes first) to ensure adequate time for furniture acquisition.
4. The FF&E information and samples are to be submitted in 8 ½" x 11" format using three ring binders with pockets on the inside of the cover. When there are numerous pages with thick samples, use more than one binder. Large D-ring binders are preferred to O-ring binders. Use page protectors that are strong enough to keep pages from tearing out. Anchor large or heavy samples with mechanical fasteners, Velcro, or double-faced foam tape rather than rubber cement or glue. Fold out items must have a maximum spread of 25 ½". Provide cover and spine inserts sheets identifying the document as "Furniture, Fixtures & Equipment" package and include the project title and location, project number, Contractor/A/E name and phone number(s), submittal stage and date.
5. The design submittal requirements will include, but are not limited to:
  - a. Narrative of Interior Design Objectives - Provide a narrative description of the furnishings design speaking to the selection of furnishings, finishes and colors. The narrative shall also include a discussion of the market research that resulted in the selection of a preferred vendor(s) items, including the sources that were considered and rejected, and why. Enumerate the design decisions made to fully coordinate the SID and the FF&E. Furthermore the narrative should include but not be limited to discussions on function, safety and ergonomics, durability, aesthetics, and all aspects of sustainability. Lastly, the narrative shall also include the written product description (item o. on the Furnishings Order Form) for each item to be procured in the FF&E package.
  - b. FF&E Procurement Listing - Provide a comprehensive listing of all the FF&E items with designation of whether each item will be procured as part of furnishings, equipment or the construction contract. The FF&E package shall be divided into sections based on this listing.
  - c. Point of Contacts - Provide a comprehensive list of Point of Contacts (POCs) needed to implement the FF&E project. This would include appropriate project team members, using activity contacts, interior design representatives, contractors and installers involved in the project. For each contact the name, company, job function, address, phone, fax and email.
  - d. Item Code Legend - Provide a consolidated list of all FF&E items in the design package with the item code and a short description of each item.
  - e. Item Installation List - The Item Code Legend may be expanded to be used as an Item installation List. Indicate quantity per room, model number, manufacturer and which vendor is responsible for installing each furnishings item.
  - f. Manufacturers Source List - Provide the Contractor's address, the ordering address, and the payment address including contact names, phone numbers, fax and email address. Also provide GSA contract information including contract number, FSC group, part, section, expiration date, maximum order limit, pricing terms, shipping terms, etc.
  - g. Furnishings Order Forms - One Furnishings Order Form will be prepared for each item selected in the design. The goal is to provide this information on one page, however, if necessary, a second page may be used for additional detailed requirements. Each form shall identify all information required to procure each individual item. In addition to the project name and location, project number, and submittal phase, the order form must include:
  - i. Furniture item illustration and code

- ii. Furniture item name
- iii. Job name, location, and date
- iv. General Services Administration (GSA) FSC Group, part, and section
- v. GSA Contract Number, Special Item Number (SIN), and contract expiration date
- vi. Maximum Order Limitation
- vii. GSA Contractor name (Include ordering and payment address, telephone number & fax number, e-mail or website)
- viii. Manufacturer's name (Include address, telephone number & fax number) or indicate if same as GSA Contractor
- ix. Dealership/Installer name (include address, telephone number, fax number and point of contact name)
- x. Product name
- xi. Product model number or National Stock Number (NSN)
- xii. Finish name and number (code to finish samples)
- xiii. Fabric name and number, minimum Wyzenbeek Abrasion Test double rubs (code to fabric samples)
- xiv. Dimensions
- xv. Written Product Description: include a non-proprietary paragraph listing the salient features of the item to include but not limited to:
  - required features and characteristics
  - ergonomic requirements
  - functional requirements
  - testing requirements
  - furniture style
  - construction materials
  - minimum warranty

(Example: "These guest chairs are coordinated to match the task seating at each workstation. The size of the guest chair is critical because of the limited space where they are to be placed. If this company is not selected, coordinate the newly proposed finishes with furniture item numbers #001, 002, 003.")

- xvi. Item location by room number
- xvii. Quantity per room
- xviii. Total quantity
- xix. Special instructions for procurement ordering and/or installation (if applicable)

xx. In addition to the preferred selected item, list two additional manufacturers' products that meet the requirements of the written product description. Information provided for each of the two additional manufacturer's products selected shall include manufacturer name address and telephone number, product series, product name and any other pertinent information necessary for their procurement.

h. Color Boards - Color boards shall be provided for all finishes and fabrics for all FF&E items. Finishes to be included but not limited to paint, laminate, wood finish, fabric, etc.

i. Itemized Furniture Cost Estimate - Provide an itemized cost estimate of furnishings keyed to the plans and specifications of products included in the package. This cost estimate should be based on GSA price schedules. The cost estimate must include separate line items for general contingency, installation, electrical hook-up for systems furniture or other furniture requiring hardwiring by a licensed electrician, freight charges and any other related costs. Installation and freight quotes from vendors should be use in lieu of a percentage allowance when available.

b) INTERIOR DESIGN DOCUMENTS

1. Overall Furniture and Area Plans - Provide floor Plans showing locations and quantities of all freestanding, and workstation furniture proposed for each floor of the building. Key each room to a large scale Furniture Placement Plan showing the furniture configuration, of all furniture. Provide enlarged area plans with a key plan identifying the area in which the building is located. All the items on the drawings should be keyed by furniture item code.

2. Workstation Plans - Provide plans showing each typical workstation configuration in plan view, elevations or isometric view. Drawings shall illustrate panels and all major components for each typical workstation configuration. Workstations shall be identified using the same numbering system as shown on the project drawings. Components shall be keyed to a legend on each sheet which identifies and describes the components along with dimensions. To facilitate review the plan, elevations and isometric of each typical workstation shall appear together on a drawing sheet.

3. Panel Plans - Provide plans showing panel locations and critical dimensions from finished face of walls, columns, panels including clearances and aisle widths. Assemblies shall be keyed to a legend which shall include width, height, configuration and composition of frames, covers finishes, and fabrics, (if different selections exist within a project), power or non-powered connectors and wall mount hardware.

4. Electrical and Telecommunication Plans - Provide plans showing power provisions including type and locations of feeder components, activated outlets and other electrical components. Include on the plans locations and quantities of outlets for workstations. Clearly identify different outlets, i.e. electrical, LAN and telecommunication receptacles indicating each type proposed. Show wiring configuration, (circuiting, switching, internal and external connections) and provide as applicable.

5. Artwork Placement Plans - Provide an Artwork Placement Plan to show location of artwork, assign an artwork item code to each piece of artwork. As an alternative, artwork can be located on the Furniture Plans. Provide a schedule that identifies each piece by room name and number. Provide installation instructions; include mounting height.

6. Window Drapery Plans - Provide Interior Window Drapery Plans. Key each drapery treatment to a schedule showing color, pattern, material, drapery size and type, draw direction, location and quantities.

c) ELECTRONIC DOCUMENTS (Not Required for Interim Submittal)

1. Upon completion of the corrected final submittal, provide five compact disks with electronic versions of all FF&E documents. Provide all drawings files in the latest release of AutoCAD. Provide all files needed to view complete drawings. These drawing files shall not be bound.

2. Provide all text documents in Microsoft Word and/or Excel.

6.19.9 FORT LEE REQUIREMENTS FOR CAD AND HARD COPY DRAWINGS

6.19.9.1 Use National Cad Standard, A/E/C CADD Standard Release 3.0 dated September 2006.

6.19.9.2 Hard Copy requirements:

Mylars are required for all as-built drawings.

9.19.9.3. CD requirements:

(a) Label CD using a label maker. See 8. CD Label Requirements. The top portion of the label shows the layout and the information required. The bottom portion is an example of a cd label.

(b) CD of all as-built drawings is required.

(c) Cost estimates are to be on a separate CD from CD with drawings.

(d) The CD that contains drawings shall have the following subdirectories and files:

cad - dwg files of every mylar drawing.

pdf - pdf files of every mylar drawing.

cal - cal files of every mylar drawing.

cal files are required only for Corps of Engineers projects.

basis of design – files related to basis of design.

6.19.9.4. Title Blocks:

(a) Fort Lee will supply title block drawings for DOL/DPW Design Projects. Insert title block drawings as a block. DOL/DPW title block drawings have attributes. Do not explode the title block drawings.

(b) Corps of Engineers will supply title block drawings for their Design Projects.

6.19.9.5. Drawing Index Sheet:

An index sheet is required for each set of drawings. Include the following on the index sheet for each drawing that makes up the set.

1. three digit sequential number starting with 001

2. sheet number

3. sheet name

6.19.9.6. Electronic CAD files names:

(a) See the National Cad Standard, A/E/C CADD Standard Release 3.0 dated September 2006 starting on page 6 for file name requirements.

(b) A 20 character project code field shall be used as part of the electronic file name for ready-to-plot files and all other files that make up a set of drawings.

(c) Ready-to-plot files – these drawings are listed on the index sheet.

(d) Ready-to-plot electronic file names shall start with a three digit sequential number starting with 001, followed by an underscore, followed by the last four digits of the Fort Lee drawing number, followed by an underscore, followed by a 10 digit project number, followed by an X or X's to complete the 20 character project code.

- (e) All other files - can be defined as reference and block files.
- (f) All other electronic file names shall start with XXX, followed by an underscore, followed by the last four digits of the Fort Lee drawing number, followed by an underscore, followed by a 10 digit project number, followed by an X or X's to complete the 20 character project code.
- (g) The drawing number and project number shall be assigned to each set of drawings by Fort Lee.
- (h) The drawing number assigned to the project by Fort Lee shall be on every drawing, the drawing number is the same for each sheet.
- (i) Use the same ready-to-plot .dwg file names for the pdf & cal files.

6.19.9.7. Misc. Requirements:

- (a) All mylar drawings and cd drawings shall match each other.
- (b) If a revision occurs after a mylar is submitted, a revised mylar drawing shall be resubmitted to replace the old mylar.
- (c) If a revision occurs to a drawing after a cd is submitted, a cd with all current drawings for the project shall be resubmitted to replace the old cd.
- (d) use the insertion point of 0,0 for all reference files.

6.19.9.8. CD Label Requirements:

The following are examples of CD Labels:

End of Section 01 10 00.0004

**SECTION 01 33 00.0004  
SUBMITTAL PROCEDURES  
(DESIGN-BUILD TASK ORDERS)**

**1.0 GENERAL**

- 1.13. GOVERNMENT APPROVED OR CONCURRED WITH SUBMITTALS
- 1.14. INFORMATION ONLY SUBMITTALS

**1.0 GENERAL**

1.1.1. This section contains requirements specifically applicable to this task order. The requirements of Base ID/IQ contract Section 01 33 30 apply to this task order, except as otherwise specified herein.

**1.13. GOVERNMENT APPROVED OR CONCURRED WITH SUBMITTALS**

Upon completion of review of submittals requiring Government approval or concurrence, the Government will stamp and date the submittals as approved or concurred. The Government will retain zero(0) copies of the submittal and return zero(0) copy(ies) of the submittal.

**1.14. INFORMATION ONLY SUBMITTALS**

Normally submittals for information only will not be returned. Approval of the Contracting Officer is not required on information only submittals. The Government reserves the right to require the Contractor to resubmit any item found not to comply with the contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications; will not prevent the Contracting Officer from requiring removal and replacement of nonconforming material incorporated in the work; and does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or for check testing by the Government in those instances where the technical specifications so prescribe. The Government will retain zero(0) copies of information only submittals.

End of Section 01 33 00.0004



**SECTION 01 33 16  
DESIGN AFTER AWARD****1.0 GENERAL INFORMATION**

1.1. INTRODUCTION

1.2. DESIGNER OF RECORD

**2.0 PRODUCTS (Not Applicable)****3.0 EXECUTION**

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3.1.1. Design Quality Control Plan

3.1.2. Post Award Conference

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3.4. INTERIM DESIGN REVIEWS AND CONFERENCES

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3.4.2. Procedures

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3.5. INTERIM DESIGN REQUIREMENTS

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3.5.2. Design Analyses

3.5.3. Geotechnical Investigations and Reports

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3.5.5. Energy Conservation

3.5.6. Specifications

3.5.7. Building Rendering

3.5.8. Interim Building Design Contents

3.6. FINAL DESIGN REVIEWS AND CONFERENCES

3.7. FINAL DESIGN REQUIREMENTS

3.7.1. Drawings

3.7.2. Design Analysis

3.7.3. Specifications

3.7.4. Submittal Register

3.7.5. Preparation of DD Form 1354 (Transfer of Real Property)

3.7.6. Acceptance and Release for Construction

3.8. DESIGN COMPLETE CONSTRUCTION DOCUMENT REQUIREMENTS

3.9. SUBMITTAL DISTRIBUTION, MEDIA AND QUANTITIES

3.9.1. Submittal Distribution and Quantities

3.9.2. Web based Design Submittals

3.9.3. Mailing of Design Submittals

3.10. AS-BUILT DOCUMENTS

**ATTACHMENT A STRUCTURAL INTERIOR DESIGN (SID) REQUIREMENTS**

**ATTACHMENT B FURNITURE, FIXTURES AND EQUIPMENT REQUIREMENTS**

**ATTACHMENT C TRACKING COMMENTS IN DRCHECKS**

**ATTACHMENT D SAMPLE FIRE PROTECTION AND LIFE SAFETY CODE REVIEW**

**ATTACHMENT E LEED SUBMITTALS**

**ATTACHMENT F BUILDING INFORMATION MODELING REQUIREMENTS**

**ATTACHMENT G DESIGN SUBMITTAL DIRECTORY AND SUBDIRECTORY FILE ARRANGEMENT**

## **1.0 GENERAL INFORMATION**

### **1.1. INTRODUCTION**

1.1.1. The information contained in this section applies to the design required after award. After award, the Contractor will develop the accepted proposal into the completed design, as described herein.

1.1.2. The Contractor may elect to fast track the design and construction that is, proceed with construction of parts of the sitework and facilities prior to completion of the overall design. To facilitate fast tracking, the Contractor may elect to divide the design into no more than ten (10) design packages per major facility type and no more than three (3) design packages for site and associated work. Designate how it will package the design, consistent with its overall plan for permitting (where applicable) and construction of the project. See Sections 01 33 00 SUBMITTAL PROCEDURES and 01 32 01.00 10 PROJECT SCHEDULE for requirements for identifying and scheduling the design packaging plan in the submittal register and project schedule. See also Sections 01 10 00 STATEMENT OF WORK and 01 57 20.00 10 ENVIRONMENTAL PROTECTION for any specified permit requirements. If early procurement of long-lead item construction materials or installed equipment, prior to completion of the associated design package, is necessary to facilitate the project schedule, also identify those long-lead items and how it will assure design integrity of the associated design package to meet the contract requirements (The Contract consists of the Solicitation requirements and the accepted proposal). Once the Government is satisfied that the long-lead items meet the contract requirements, the Contracting Officer will allow the Contractor to procure the items at its own risk.

1.1.3. The Contractor may proceed with the construction work included in a separate design package after the Government has reviewed the final (100%) design submission for that package, review comments have been addressed and resolved to the Government's satisfaction and the Contracting Officer (or the Administrative Contracting Officer) has agreed that the design package may be released for construction.

1.1.4. **INTEGRATED DESIGN.** To the maximum extent permitted for this project, use a collaborative, integrated design process for all stages of project delivery with comprehensive performance goals for siting, energy, water, materials and indoor environmental quality and ensures incorporation of these goals. Consider all stages of the building lifecycle, including deconstruction.

### **1.2. DESIGNER OF RECORD**

Identify, for approval, the Designer of Record ("DOR") that will be responsible for each area of design. One DOR may be responsible for more than one area. Listed, Professional Registered, DOR(s) shall account for all areas of design disciplines shall be accounted for by a listed. The DOR's shall stamp, sign, and date each design drawing and other design deliverables under their responsible discipline at each design submittal stage (see contract clause Registration of Designers). If the deliverables are not ready for release for construction, identify them as "preliminary" or "not for release for construction" or by using some other appropriate designation. The DOR(s) shall also be responsible for maintaining the integrity of the design and for compliance with the contract requirements through construction and documentation of the as-built condition by coordination, review and approval of extensions of design, material, equipment and other construction submittals, review and approval or disapproval of requested deviations to the accepted design or to the contract, coordination with the Government of the above activities, and by performing other typical professional designer responsibilities.

## **2.0 PRODUCTS (Not Applicable)**

## **3.0 EXECUTION**

### **3.1. PRE-WORK ACTIVITIES & CONFERENCES**

#### **3.1.1. Design Quality Control Plan**

Submit for Government acceptance, a Design Quality Control Plan in accordance with Section 01 45 04.00 10 CONTRACTOR QUALITY CONTROL before design may proceed.

#### **3.1.2. Post Award Conference**

3.1.2.1. The government will conduct a post award contract administration conference at the project site, as soon as possible after contract award. This will be coordinated with issuance of the contract notice to proceed (NTP). The Contractor and major sub-contractor representatives shall participate. All designers need not attend this first meeting. Government representatives will include COE project delivery team members, facility users, facility command representatives, and installation representatives. The Government will provide an agenda, meeting goals, meeting place, and meeting time to participants prior to the meeting.

3.1.2.2. The post award conference shall include determination and introduction of contact persons, their authorities, contract administration requirements, discussion of expected project progress processes, and coordination of subsequent meetings for quality control (see Section 01 45 04.00 10 CONTRACTOR QUALITY CONTROL), Partnering (see below and SCR: Partnering), and the initial design conference (see below).

3.1.2.3. The government will introduce COE project delivery team members, facility users, facility command representatives, and installation representatives. The DB Contractor shall introduce major subcontractors, and other needed staff. Expectations and duties of each person shall be defined for all participants. A meeting roster shall be developed and distributed by the government with complete contact information including name, office, project role, phone, mailing and physical address, and email address.

### 3.1.3. Partnering & Project Progress Processes

3.1.3.1. The initial Partnering conference may be scheduled and conducted at any time with or following the post award conference. The Government proposes to form a partnership with the DB Contractor to develop a cohesive building team. This partnership will involve the COE project delivery team members, facility users, facility command representatives, installation representatives, Designers of Record, major subcontractors, contractor quality control staff, and contractor construction management staff. This partnership will strive to develop a cooperative management team drawing on the strengths of each team member in an effort to achieve a quality project within budget and on schedule. This partnership will be bilateral in membership and participation will be totally voluntary. All costs, excluding labor and travel expenses, shall be shared equally between the Government and the Contractor. The Contractor and Government shall be responsible for their own labor and travel costs. Normally, partnering meetings will be held at or in the vicinity of the project installation.

3.1.3.2. As part of the partnering process, the Government and Contractor shall develop, establish, and agree to comprehensive design development processes including conduct of conferences, expectations of design development at conferences, fast-tracking, design acceptance, Structural Interior Design (SID)/ Furniture, Fixtures & Equipment (FF&E) design approval, project closeout, etc. The government will explain contract requirements and the DB Contractor shall review their proposed project schedule and suggest ways to streamline processes.

### 3.1.4. Initial Design Conference

The initial design conference may be scheduled and conducted at the project installation any time after the post award conference, although it is recommended that the partnering process be initiated with or before the initial design conference. Any design work conducted after award and prior to this conference should be limited to site and is discouraged for other items. All Designers of Record shall participate in the conference. The purpose of the meeting is to introduce everyone and to make sure any needs the contractor has are assigned and due dates established as well as who will get the information. See also Attachment F, BUILDING INFORMATION MODELING REQUIREMENTS for discussion concerning the BIM Implementation Plan demonstration at this meeting. The DB Contractor shall conduct the initial design conference.

### 3.1.5. Pre-Construction Conference

Before starting construction activities, the Contractor and Government will jointly conduct a pre-construction administrative conference to discuss any outstanding requirements and to review local installation requirements for start of construction. It is possible there will be multiple Pre-Construction Conferences based on the content of the design packages selected by the Contractor. The Government will provide minutes of this meeting to all participants.

## 3.2. STAGES OF DESIGN SUBMITTALS AND OVER THE SHOULDER PROGRESS REVIEWS

The stages of design submittals described below define Government expectations with respect to process and content. The Contractor shall determine how to best plan and execute the design and review process for this project, within the parameters listed below. As a minimum, the Government expects to see at least one interim design submittal, at least one final design submittal before construction of a design package may proceed and at least one Design Complete submittal that documents the accepted design. The Contractor may sub-divide the design into separate packages for each stage of design and may proceed with construction of a package after the Government accepts the final design for that package. See discussion on waivers to submission of one or more intermediate design packages where the parties partner during the design process. See also Attachment F, BUILDING INFORMATION MODELING REQUIREMENTS for discussion concerning BIM and the various stages of design submittals and over-the-shoulder progress reviews.

### 3.2.1. Site/Utilities

To facilitate fast-track design-construction activities the contractor may submit a final (100%) site and utility design as the first design submittal or it may elect to submit interim and final site and utility design submittals as explained below. Following review, resolution, and incorporation of all Government comments, and submittal of a satisfactory set of site/utility design documents, after completing all other pre-construction requirements in this contract and after the pre-construction meeting, the Government will allow the Contractor to proceed with site development activities, including demolition where applicable, within the parameters set forth in the accepted design submittal. For the first site and utility design submission, whether an interim or final, the submittal review, comment, and resolution times from this specification apply, except that the Contractor shall allow the Government a 14 calendar day review period, exclusive of mailing time. No on-site construction activities shall begin prior to written Government clearance to proceed.

### 3.2.2. Interim Design Submittals

The Contractor may submit either a single interim design for review, representing a complete package with all design disciplines, or split the interim design into smaller, individual design packages as it deems necessary for fast-track construction purposes. As required in Section 01 32 01.00 10 PROJECT SCHEDULE, the Contractor shall schedule its design and construction packaging plan to meet the contract completion period. This submission is the Government's primary opportunity to review the design for conformance to the solicitation and to the accepted contract proposal and to the Building Codes at a point where required revisions may be still made, while minimizing lost design effort to keep the design on track with the contract requirements. The requirements for the interim design review submittals and review conferences are described hereinafter. This is not necessarily a hold point for the design process; the Contractor may designate the interim design submittal(s) as a snapshot and proceed with design development at its own risk. See below for a waiver, where the parties establish an effective over-the-shoulder progress review procedure through the partnering process that would eliminate the need for or expedite a formal intermediate design review on one or more individual design packages.

### 3.2.3. Over-the-Shoulder Progress Reviews

To facilitate a streamlined design-build process, the Government and the Contractor may agree to one-on-one reviewer or small group reviews, electronically, on-line (if available within the Contractor's standard design practices) or at the Contractor's design offices or other agreed location, when practicable to the parties. The Government and Contractor will coordinate such reviews to minimize or eliminate disruptions to the design process. Any data required for these reviews shall normally be provided in electronic format, rather than in hard copy. If the Government and Contractor establish and implement an effective, mutually agreeable partnering procedure for regular (e.g., weekly) over-the-shoulder review procedures that allow the Government reviewers the opportunity to keep fully informed of the progress, contents, design intent, design documentation, etc. of the design package, the Government will agree to waive or to expedite the formal intermediate design review period for that package. The Contractor shall still be required to submit the required intermediate design documentation, however the parties may agree to how that material will be provided, in lieu of a formal consolidated submission of the package. It should be noted that Government funding is extremely limited for non-local travel by design reviewers, so the maximum use of virtual teaming methods must be used. Some possible examples include electronic file sharing, interactive software with on-line or telephonic conferencing, televideo conferencing, etc. The Government must still perform its Code and Contract conformance reviews, so the Contractor is encouraged to partner with the reviewers to find ways to facilitate this process and to facilitate meeting or bettering the design-build schedule. The Contractor shall maintain a fully functional configuration management system as described herein to track design revisions, regardless of whether or not there is a need for a formal intermediate design review. The formal intermediate

review procedures shall form the contractual basis for the official schedule, in the event that the partnering process determines that the formal intermediate review process to be best suited for efficient project execution. However, the Government pledges to support and promote the partnering process to work with the Contractor to find ways to better the design schedule.

#### 3.2.4. Final Design Submissions

This submittal is required for each design package prior to Government acceptance of that design package for construction. The requirements for the final design submittal review conferences and the Government's acceptance for start of construction are described herein after.

#### 3.2.5. Design Complete Submittals

After the final design submission and review conference for a design package, revise the design package to incorporate the comments generated and resolved in the final review conferences, perform and document a back-check review and submit the final, design complete documents, which shall represent released for construction documents. The requirements for the design complete submittals are described hereinafter.

#### 3.2.6. Holiday Periods for Government Review or Actions

Do not schedule meetings, Government reviews or responses during the last two weeks of December or other designated Government Holidays (including Friday after Thanksgiving). Exclude such dates and periods from any durations specified herein for Government actions.

#### 3.2.7. Late Submittals and Reviews

If the Contractor cannot meet its scheduled submittal date for a design package, it must revise the proposed submittal date and notify the government in writing, at least one (1) week prior to the submittal, in order to accommodate the Government reviewers' other scheduled activities. If a design submittal is over one (1) day late in accordance with the latest revised design schedule, or if notification of a proposed design schedule change is less than seven (7) days from the anticipated design submission receipt date, the Government review period may be extended up to seven (7) days due to reviewers' schedule conflicts. If the Government is late in meeting its review commitment and the delay increases the Contractor's cost or delays completion of the project, the Suspension of Work and Defaults clauses provide the respective remedy or relief for the delay.

### 3.3. DESIGN CONFIGURATION MANAGEMENT

#### 3.3.1. Procedures

Develop and maintain effective, acceptable design configuration management (DCM) procedures to control and track all revisions to the design documents after the Interim Design Submission through submission of the As-Built documents. During the design process, this will facilitate and help streamline the design and review schedule. After the final design is accepted, this process provides control of and documents revisions to the accepted design (See Special Contract Requirement: Deviating From the Accepted Design). The system shall include appropriate authorities and concurrences to authorize revisions, including documentation as to why the revision must be made. The DCM data shall be available to the Government reviewers at all times. The Contractor may use its own internal system with interactive Government concurrences, where necessary or may use the Government's "DrChecks Design Review and Checking System" (see below and Attachment C).

#### 3.3.2. Tracking Design Review Comments

Although the Contractor may use its own internal system for overall design configuration management, the Government and the Contractor shall use the DrChecks Design Review and Checking System to initiate, respond to, resolve and track Government design compliance review comments. This system may be useful for other data which needs to be interactive or otherwise available for shared use and retrieval. See Attachment C for details on how to establish an account and set-up the DrChecks system for use on the project.

#### 3.3.3. Design and Code Checklists

Develop and complete various discipline-specific checklists to be used during the design and quality control of each submittal. Submit these completed checklists with each design submittal, as applicable, as part of the project documentation. See Section 01 45 04.00 10 Contractor Quality Control, Attachment D for a Sample Fire Protection and Life Safety Code review checklist and Attachment E for LEED SUBMITTALS.

### 3.4. INTERIM DESIGN REVIEWS AND CONFERENCES

#### 3.4.1. General

At least one interim design submittal, review and review conference is required for each design package (except that, per paragraph 3.2.1, the Contractor may skip the interim design submission and proceed directly to final design on the sitework and utilities package). The DB Contractor may include additional interim design conferences or over-the-shoulder reviews, as needed, to assure continued government concurrence with the design work. Include the interim submittal review periods and conferences in the project schedule and indicate what part of the design work is at what percentage of completion. The required interim design conferences shall be held when interim design requirements are reached as described below. See also Paragraph: **Over-the-Shoulder Progress Reviews** for a waiver to the formal interim design review.

#### 3.4.2. Procedures

After receipt of an Interim Design submission, allow the Government fourteen (14) calendar days after receipt of the submission to review and comment on the interim design submittal. For smaller design packages, especially those that involve only one or a few separate design disciplines, the parties may agree on a shorter review period or alternative review methods (e.g., over-the-shoulder or electronic file sharing), through the partnering process. For each interim design review submittal, the COR will furnish, to the Contractor, a single consolidated, validated listing of all comments from the various design sections and from other concerned agencies involved in the review process using the DrChecks Design Review and Checking System. The review will be for conformance with the technical requirements of the solicitation and the Contractor's RFP proposal. If the Contractor disagrees technically with any comment or comments and does not intend to comply with the comment, he/she must clearly outline, with ample justification, the reasons for noncompliance within five (5) days after receipt of these comments in order that the comment can be resolved. Furnish disposition of all comments, in writing, through DrChecks. The Contractor is cautioned that if it believes the action required by any comment exceeds the requirements of this contract, that it should take no action and notify the COR in writing immediately. The Interim Review conference will be held for each design submittal at the installation. Bring the personnel that developed the design submittal to the review conference. The conference will take place the week after the receipt of the comments by the Contractor. For smaller fast-track packages that involve only a few reviewers, the parties may agree to alternative conferencing methods, such as teleconferencing, or televideo, where available, as determined through Partnering.

#### 3.4.3. Conference Documentation

3.4.3.1. In order to facilitate and accelerate the Government code and contract conformance reviews, identify, track resolution of and maintain all comments and action items generated during the design process and make this available to the designers and reviewers prior to the Interim and subsequent design reviews.

3.4.3.2. The DB Contractor shall prepare meeting minutes and enter final resolution of all comments into DrChecks. Copies of comments, annotated with comment action agreed on, will be made available to all parties before the conference adjourns. Unresolved problems will be resolved by immediate follow-on action at the end of conferences. Incorporate valid comments. The Government reserves the right to reject design document submittals if comments are significant. Participants shall determine if any comments are critical enough to require further design development prior to government concurrence. Participants shall also determine how to proceed in order to obtain government concurrence with the design work presented.

### 3.5. INTERIM DESIGN REQUIREMENTS

Interim design deliverables shall include drawings, specifications, and design analysis for the part of design that the Contractor considers ready for review.

#### 3.5.1. Drawings



Include comments from any previous design conferences incorporated into the documents to provide an interim design for the "part" submitted.

### 3.5.2. Design Analyses

3.5.2.1. The designers of record shall prepare and present design analyses with calculations necessary to substantiate and support all design documents submitted. Address design substantiation required by the applicable codes and references and pay particular attention to the following listed items:

3.5.2.2. For parts including sitework, include site specific civil calculations.

3.5.2.3. For parts including structural work, include structural calculations.

- (a) Identify all loads to be used for design.
- (b) Describe the method of providing lateral stability for the structural system to meet seismic and wind load requirements. Include sufficient calculations to verify the adequacy of the method.
- (c) Provide calculations for all principal roof, floor, and foundation members and bracing and secondary members.
- (d) Provide complete seismic analyses for all building structural, mechanical, electrical, architectural, and building features as dictated by the seismic zone for which the facility is being constructed.
- (e) Computer generated calculations must identify the program name, source, and version. Provide input data, including loads, loading diagrams, node diagrams, and adequate documentation to illustrate the design. The schematic models used for input must show, as a minimum, nodes/joints, element/members, materials/properties, and all loadings, induced settlements/deflections, etc., and a list of load combinations. Include an output listing for maximum/minimum stresses/forces and deflections for each element and the reactions for each loading case and combination.
- (f) See also the Security (Anti-Terrorism) requirements below for members subject to Anti-Terrorist Force Protection (ATFP) and Progressive Collapse requirements.
- (g) Fully coordinate and integrate the overall structural design between two different or interfacing construction types, such as modular and stick-built or multistory, stacked modular construction. Provide substantiation of structural, consolidation/settlement analysis, etc., as applicable, through the interfaces.

3.5.2.4. For Security (Anti-Terrorism): Provide a design narrative and calculations where applicable, demonstrating compliance with each of the 22 standards in UFC 4-010-01, which includes Design of Buildings to Resist Progressive Collapse (use the most recent version of UFC 4-023-03, regardless of references to any specific version in UFC 4-010-01). Where sufficient standoff distance is not being provided, show calculations for blast resistance of the structural system and building envelope. Show complete calculations for members subjected to ATFP loads, e.g., support members of glazed items (jambs, headers, sills) connections of windows to support members and connections of support members to the rest of the structure. For 3 story and higher buildings, provide calculations to demonstrate compliance with progressive collapse requirements.

3.5.2.5. For parts including architectural work, include building floor area analysis.

3.5.2.6. For parts including mechanical work, include HVAC analysis and calculations. Include complete design calculations for mechanical systems. Include computations for sizing equipment, compressed air systems, air duct design, and U-factors for ceilings, roofs and exterior walls and floors. Contractor shall employ commercially available energy analysis techniques to determine the energy performance of all passive systems and features. Use of hourly energy load computer simulation is required (see paragraph 3.5.5.2 for list of acceptable software). Based on the results of calculations, provide a complete list of the materials and equipment proposed with the manufacturer's published cataloged product installation specifications and roughing-in data.

3.5.2.7. For parts including life safety, include building code analysis and sprinkler and other suppression systems. Notwithstanding the requirements of the Codes, address the following:

- (a) A registered fire protection engineer (FPE) must perform all fire protection analyses. Provide the fire protection engineer's qualifications. See Section 01 10 00, paragraph 5 for qualifications.

- (b) Provide all references used in the design including Government design documents and industry standards used to generate the fire protection analysis.
- (c) Provide classification of each building in accordance with fire zone, building floor areas and height and number of stories.
- (d) Provide discussion and description of required fire protection requirements including extinguishing equipment, detection equipment, alarm equipment and water supply. Alarm and detection equipment shall interface to requirements of Electronic Systems.
- (e) Provide hydraulic calculations based on water flow test for each sprinkler system to insure that flow and pressure requirements can be met with current water supply. Include copies of Contractor's water flow testing done to certify the available water source.

3.5.2.8. For parts including plumbing systems:

- (a) List all references used in the design.
- (b) Provide justification and brief description of the types of plumbing fixtures, piping materials and equipment proposed for use.
- (c) Detail calculations for systems such as sizing of domestic hot water heater and piping; natural gas piping; LP gas piping and tanks, fuel oil piping and tanks, etc., as applicable.
- (d) When the geotechnical report indicates expansive soils are present, indicate in the first piping design submittal how piping systems will be protected against damage or backfall/backflow due to soil heave (from penetration of slab to the 5 foot building line).

3.5.2.9. For elevator systems:

- (a) List all criteria codes, documents and design conditions used.
- (b) List any required permits and registrations for construction of items of special mechanical systems and equipment.

3.5.2.10. For parts including electrical work, include lighting calculations to determine maintained foot-candle levels, electrical load analysis and calculations, electrical short circuit and protective device coordination analysis and calculations and arc fault calculations.

3.5.2.11. For parts including telecommunications voice/data (including SIPRNET, where applicable), include analysis for determining the number and placement of outlets

3.5.2.12. For Cathodic Protection Systems, provide the following stamped report by the licensed corrosion engineer or NACE specialist with the first design submission. The designer must be qualified to engage in the practice of corrosion control of buried or submerged metallic surfaces. He/she must be accredited or certified by the National Association of Corrosion Engineers (NACE) as a NACE Accredited Corrosion Specialist or a NACE certified Cathodic Protection Specialist, or must be a registered professional engineer with a minimum of five years experience in corrosion control and cathodic protection. Clearly describe structures, systems or components in soil or water to be protected. Describe methods proposed for protection of each.

3.5.3. Geotechnical Investigations and Reports:

3.5.3.1. The contractor's licensed geotechnical engineer shall prepare a final geotechnical evaluation report, to be submitted along with the first foundation design submittal. Make this information available as early as possible during the over-the-shoulder progress review process. Summarize the subsurface conditions and provide recommendations for the design of appropriate utilities, foundations, floor slabs, retaining walls, embankments, and pavements. Include compaction requirements for fill and backfill under buildings, sidewalks, other structures and open areas. Recommend foundation systems to be used, allowable bearing pressures for footings, lateral load resistance capacities for foundation systems, elevations for footings, grade beams, slabs, etc. Provide an assessment of post-construction settlement potential including total and differential. Provide recommendations regarding lateral earth pressures (active, at-rest, passive) to be used in the design of retaining walls. Include the recommended spectral accelerations and Site Class for seismic design along with an evaluation of any seismic hazards and recommendations for mitigation, if required. Include calculations to support the recommendations for bearing capacity, settlement, and pavement sections. Include supporting documentation for all recommended

design parameters such as Site Class, shear strength, earth pressure coefficients, friction factors, subgrade modulus, California Bearing Ratio (CBR), etc. Provide earthwork recommendations, expected frost penetration, expected groundwater levels, recommendations for dewatering and groundwater control and the possible presence of any surface or subsurface features that may affect the construction of the project such as sinkholes, boulders, shallow rock, old fill, old structures, soft areas, or unusual soil conditions. Include pH tests, salinity tests, resistivity measurements, etc., required to design corrosion control and grounding systems. Include the raw field data. Arrange a meeting with the Government subsequent to completion and evaluation of the site specific geotechnical exploration to outline any differences encountered that are inconsistent with the Government provided preliminary soils information. Clearly outline differences which require changes in the foundation type, or pavement and earthwork requirements from that possible and contemplated using the Government furnished preliminary soils investigation, which result in a change to the design or construction. Any equitable adjustment is subject to the provisions of the contract's Differing Site Conditions Clause.

3.5.3.2. Vehicle Pavements: The Contractor's geotechnical report shall contain flexible and rigid pavement designs, as applicable for the project, including design CBR and modulus of subgrade reaction and the required compaction effort for subgrades and pavement layers. Provide Information on the types of base course materials available in the area and design strengths.

3.5.3.3. The Contractor and the professional geotechnical engineer consultant shall certify in writing that the design of the project has been developed consistent with the Contractor's final geotechnical report. The certification shall be stamped by the consulting professional geotechnical engineer and shall be submitted with the first design submission. If revisions are made to the initial design submission, a new certification shall be provided with the final design submission.

#### 3.5.4. LEED Documentation:

Assign a LEED Accredited Professional, responsible to track LEED planning, performance and documentation for each LEED credit through construction closeout. Incorporate LEED credits in the plans, specifications and design analyses. Develop LEED supporting documentation as a separable portion of the Design Analysis and provide with each required design submittal. Include the LEED Project checklist for each non-exempt facility (one checklist may be provided for multiple facilities in accordance with the LEED-NC Application Guide for Multiple Buildings and On-Campus Building Projects and the LEED SUBMITTALS (Attachment E, herein) with each submittal. Final design submittal for each portion of the work must include all required design documentation relating to that portion of work (example - all site credit design documents with final site design). Submittal requirements are as indicated in Attachment E, LEED SUBMITTALS. Submit all documentation indicated on Attachment E as due at final design at final design submittal (for fast-track projects with multiple final design submittals, this shall be at the last scheduled final design submittal). All project documentation related to LEED shall conform to USGBC requirements for both content and format, including audit requirements and be separate from other design analyses. Maintain and update the LEED documentation throughout project progress to construction closeout and shall compile product data, receipts, calculations and other data necessary to substantiate and support all credits claimed. The Government may audit any or all individual credits. Audit documentation is not required to be submitted unless requested. These requirements apply to all projects. If the project requires the Contractor to obtain USGBC certification, the Contractor shall also be responsible for obtaining USGBC certification and shall provide written evidence of certification with the construction closeout LEED documentation submittal. Install the USGBC building plaque at the location indicated by the Government upon receipt. If Contractor obtains USGBC interim design review, submit the USGBC review to the Government within 30 days of receipt for information only.

3.5.4.1. LEED Documentation for Technology Solution Set. If the Solicitation provides a Prescriptive Technology Solution Set, use of the Technology Solution set has no effect on LEED documentation requirements. Provide all required LEED documentation, including energy analysis, in accordance with LEED requirements when using the Technology Solution Set.

#### 3.5.5. Energy Conservation:

3.5.5.1. Refer to Section 01 10 00, Paragraph 5. Interim and Final Design submittals shall demonstrate that each building including the building envelope, HVAC systems, service water heating, power, and lighting systems meet the Mandatory Provisions and the Prescriptive Path requirements of ASHRAE 90.1. Use Compliance Documentation forms available from ASHRAE and included in the ASHRAE 90.1 User's Manual for this purpose. The Architectural Section of the Design Analysis shall include completed forms titled "Building Envelope

Compliance Documentation Parts I and II". The Heating Ventilating and Air Conditioning (HVAC) Section of the Design Analysis shall include a completed form titled "HVAC Simplified Approach Option - Part I" if this approach is allowed by the Standard. Otherwise, the HVAC Section of the Design Analysis shall include completed forms titled "HVAC Mandatory Provisions - Part II" and "HVAC Prescriptive Requirements - Part III". The Plumbing Section of the Design Analysis shall include a completed form titled "Service Water Heating Compliance Documentation". The Electrical Section of the Design Analysis shall include an explanatory statement on how the requirements of ASHRAE 90.1-2004 Chapter 8 Power were met. The Electrical Section of the Design Analysis shall also include a completed form titled "Lighting Compliance Documentation".

3.5.5.2. Interim and Final Design submittals which address energy consuming systems, (heating, cooling, service hot water, lighting, power, etc.) must also include calculations in a separate Energy Conservation Section of the Design Analysis which demonstrate and document (a) the baseline energy consumption for the facility or facilities under contract, that would meet the requirements of ANSI/ASHRAE/IESNA Standard 90.1 and (b) the energy consumption of the facility or facilities under contract utilizing the materials and methods required by this construction contract. Use the USGBC Energy and Atmosphere (EA) Credit 1 compliance template / form or an equivalently detailed form for documenting compliance with the energy reduction requirements. This template / form is titled PERFORMANCE RATING METHOD and is available when the project is registered for LEED. The calculation methodology used for this documentation and analysis shall follow the guidelines set forth in Appendix G of ASHRAE 90.1, with two exceptions: a) receptacle and process loads may be omitted from the calculation; and b) the definition of the terms in the formula for Percentage Improvement found in paragraph G1.2 are modified as follows: Baseline Building Performance shall mean the annual energy consumption calculated for a building design intended for use as a baseline for rating above standard design meeting the minimum requirements of the energy standard, and Proposed Building Performance shall mean annual energy consumption calculated for the proposed building design intended for construction. This calculation shall address all energy consuming systems in a single integrated methodology. Include laboratory fume hoods and kitchen ventilation loads in the energy calculation. They are not considered process loads. Individual calculations for heating, cooling, power, lighting, power, etc. systems will not be acceptable. The following building simulation software is acceptable for use in calculating building energy consumption: Hourly Analysis Program (HAP) by Carrier Corp., TRACE 700 by Trane Corp., DOE-2 by US Department of Energy, EnergyPlus by DOD/DOE.

#### 3.5.6. Specifications

Specifications may be any one of the major, well known master guide specification sources (use only one source) such as MASTERSPEC from the American Institute of Architects, SPECTEXT from Construction Specification Institute or Unified Facility Guide Specifications (UFGS using MASTERFORMAT 2004 numbering system), etc. (including specifications from these sources). Manufacturers' product specifications, utilizing CSI's Manu-Spec, three part format may be used in conjunction with the selected specifications. The designers of record shall edit and expand the appropriate Specifications to insure that all project design requirements, current code requirements, and regulatory requirements are met. Specifications shall clearly identify, where appropriate, specific products chosen to meet the contract requirements (i.e., manufacturers' brand names and model numbers or similar product information).

#### 3.5.7. Building Rendering

Present and provide a draft color computer, artist, or hand drawn rendering with the conceptual design submittal of the building exterior. Perspective renderings shall include a slightly overhead view of the entire building to encompass elevations and the roof configuration of the building. After Government review and acceptance, provide a final rendering, including the following:

Three (3) 18" x 24" color prints, framed and matted behind glass with project title underneath the print.

One (1) Image file (high resolution) in JPG format on CD for those in the submittal distribution list.

#### 3.5.8. Interim Building Design Contents

The following list represents what the Government considers should be included in the overall completed design for a facility or project. It is not intended to limit the contractor from providing different or additional information as needed to support the design presented, including the require design analyses discussed above. As the Contractor develops individual design packages and submits them for Interim review, include as much of the applicable

information for an individual design package as is developed at the Interim design level for review purposes. These pieces shall be developed as the design progresses toward the design complete stage.

#### 3.5.8.1. Lawn and Landscaping Irrigation System

#### 3.5.8.2. Landscape, Planting and Turfing

#### 3.5.8.3. Architectural

- (a) Design Narrative
- (b) Architectural Floor Plans, Typical Wall and Roof Sections, Elevations
- (c) Finish schedule
- (d) All required equipment
- (e) Special graphics requirements
- (f) Door and Window Schedules
- (g) Hardware sets using BHMA designations
- (h) Composite floor plan showing all pre-wired workstations
- (i) Structural Interior Design (SID) package: See ATTACHMENT A for specific requirements
- (j) Furniture, Fixtures & Equipment (FF&E) design package: See ATTACHMENT B for specific requirements

#### 3.5.8.4. Structural Systems. Include:

- (a) Drawings showing principal members for roof and floor framing plans as applicable
- (b) Foundation plan showing main foundation elements where applicable
- (c) Typical sections for roof, floor, and foundation conditions

#### 3.5.8.5. Plumbing Systems

- (a) Show locations and general arrangement of plumbing fixtures and major equipment
- (b) Plan and isometric riser diagrams of all areas including hot water, cold water, waste and vent piping. Include natural gas (and meter as required), (natural gas and meter as required), (LP gas), (fuel oil) and other specialty systems as applicable.
- (c) Include equipment and fixture connection schedules with descriptions, capacities, locations, connection sizes and other information as required

#### 3.5.8.6. HVAC Systems

- (a) Mechanical Floor Plans: The floor plans shall show all principle architectural features of the building which will affect the mechanical design. The floor plans shall also show the following:
  - (1) Room designations.
  - (2) Mechanical legend and applicable notes.
  - (3) Location and size of all ductwork and piping.
  - (4) Location and capacity of all terminal units (i.e., registers, diffusers, grilles, hydronic baseboards).
  - (5) Pre-Fabricated Paint Spray Booth (where applicable to project scope)
  - (6) Paint Preparation Area (where applicable to project scope)
  - (7) Exhaust fans and specialized exhaust systems.
  - (8) Thermostat location.
  - (9) Location of heating/cooling plant (i.e., boiler, chiller, cooling tower, etc).
  - (10) Location of all air handling equipment.

- (11) Air balancing information.
- (12) Flue size and location.
- (13) Piping diagram for forced hot water system (if used).
- (b) Equipment Schedule: Provide complete equipment schedules. Include:
  - (1) Capacity
  - (2) Electrical characteristics
  - (3) Efficiency (if applicable)
  - (4) Manufacturer's name
  - (5) Optional features to be provided
  - (6) Physical size
  - (7) Minimum maintenance clearances
- (a) Details: Provide construction details, sections, elevations, etc., only where required for clarification of methods and materials of design.
- (b) HVAC Controls: Submit complete HVAC controls equipment schedules, sequences of operation, wiring and logic diagrams, Input/Output Tables, equipment schedules, and all associated information. See the Statement of Work for additional specific requirements.

#### 3.5.8.7. Fire Protection and Life Safety.

- (a) Provide plan for each floor of each building that presents a compendium of the total fire protection features being incorporated into the design. Include the following types of information:
  - (1) The location and rating of any fire-resistive construction such as occupancy separations, area separations, exterior walls, shaft enclosures, corridors, stair enclosures, exit passageways, etc.
  - (2) The location and coverage of any fire detection systems
  - (3) The location and coverage of any fire suppression systems (sprinkler risers, standpipes, etc.)
  - (4) The location of any other major fire protection equipment
  - (5) Indicate any hazardous areas and their classification
  - (6) Schedule describing the internal systems with the following information: fire hazard and occupancy classifications, building construction type, GPM/square foot sprinkler density, area of operation and other as required
- (b) Working plans and all other materials submitted shall meet NFPA 13 requirements, with respect to required minimum level of detail.

#### 3.5.8.8. Elevators. Provide:

- (a) Description of the proposed control system
- (b) Description, approximate capacity and location of any special mechanical equipment for elevators.

#### 3.5.8.9. Electrical Systems.

- (a) Electrical Floor Plan(s): Show all principle architectural features of the building which will affect the electrical design. Show the following:
  - (1) Room designations.
  - (2) Electrical legend and applicable notes.
  - (3) Lighting fixtures, properly identified.
  - (4) Switches for control of lighting.
  - (5) Receptacles.

- (6) Location and designation of panelboards. Clearly indicate type of mounting required (flush or surface) and reflect accordingly in specifications.
- (7) Service entrance (conduit and main disconnect).
- (8) Location, designation and rating of motors and/or equipment which requires electrical service. Show method of termination and/or connection to motors and/or equipment. Show necessary junction boxes, disconnects, controllers (approximate only), conduit stubs, and receptacles required to serve the motor and/or equipment.
- (b) Building Riser Diagram(s) (from pad-mounted transformer to unit load center panelboard): Indicate the types and sizes of electrical equipment and wiring. Include grounding and metering requirements.
- (c) Load Center Panelboard Schedule(s): Indicate the following information:
  - (1) Panelboard Characteristics (Panel Designation, Voltage, Phase, Wires, Main Breaker Rating and Mounting.
  - (2) Branch Circuit Designations.
  - (3) Load Designations.
  - (4) Circuit Breaker Characteristics. (Number of Poles, Trip Rating, AIC Rating)
  - (5) Branch Circuit Connected Loads (AMPS).
  - (6) Special Features
- (d) Lighting Fixture Schedule(s): Indicate the following information:
  - (1) Fixture Designation.
  - (2) General Fixture Description.
  - (3) Number and Type of Lamp(s).
  - (4) Type of Mounting.
  - (5) Special Features.
- (e) Details: Provide construction details, sections, elevations, etc. only where required for clarification of methods and materials of design.

3.5.8.10. Electronic Systems including the following responsibilities:

- (a) Fire Detection and Alarm System. Design shall include layout drawings for all devices and a riser diagram showing the control panel, annunciator panel, all zones, radio transmitter and interfaces to other systems (HVAC, sprinkler, etc.)
- (b) Fire Suppression System Control. Specify all components of the Fire Suppression (FS) System in the FS section of the specifications. Clearly describe how the system will operate and interact with other systems such as the fire alarm system. Include a riser diagram on the drawings showing principal components and interconnections with other systems. Include FS system components on drawing legend. Designate all components shown on floor plans "FS system components" (as opposed to "Fire Alarm components"). Show location of FS control panels, HVAC control devices, sensors, and 120V power panel connections on floor plans. Indicate zoning of areas by numbers (1, 2, 3) and detectors sub-zoned for cross zoning by letter designations (A and B). Differentiate between ceiling mounted and under floor detectors with distinct symbols and indicate sub-zone of each.
- (c) Public Address System
- (d) Special Grounding Systems. Completely reflect all design requirements in the specifications and drawings. Specifications shall require field tests (in the construction phase), witnessed by the Government, to determine the effectiveness of the grounding system. Include drawings showing existing construction, if any.
- (e) Cathodic Protection.
- (f) Intrusion Detection, Card Access System
- (g) Central Control and Monitoring System
- (h) Mass Notification System
- (i) Electrical Power Distribution Systems

#### 3.5.8.11. Information Systems including the following responsibilities:

- (a) Telecommunications Cabling
- (b) Supporting Infrastructure
- (a) Outside Plant (OSP) Cabling - Campus or Site Plans - Exterior Pathways and Inter-Building Backbones
  - (a) Include a layout of the voice/data outlets (including voice only wall & pay phones) on telecommunication floor plan drawing, location of SIPRNET data outlets (where applicable), and a legend and symbol definition to indicate height above finished floor. Show size of conduit and cable type and size on Riser Diagram. Do not show conduit runs between backboard and outlets on the floor plans. Show underground distribution conduit and cable with sizing from point of presence to entrance facility of building.
  - (b) Layout of complete building per floor - Serving Zone Boundaries, Backbone Systems, and Horizontal Pathways including Serving Zones Drawings - Drop Locations and Cable ID's
  - (c) Communication Equipment Rooms - Plan Views - Tech and AMEP/Elevations - Racks and Walls. Elevations with a detailed look at all telecom rooms. Indicate technology layout (racks, ladder-racks, etc.), mechanical/electrical layout, rack elevation and backboard elevation. They may also be an enlargement of a congested area of T1 or T2 series drawing.

#### 3.6. FINAL DESIGN REVIEWS AND CONFERENCES

A final design review and review conference will be held upon completion of final design at the project installation, or – where equipment is available - by video teleconference or a combination thereof, for any design package to receive Government acceptance to allow release of the design package for construction. For smaller separate design packages, the parties may agree on alternative reviews and conferences (e.g., conference calls and electronic file sharing, etc.) through the Partnering process. Include the final design conference in the project schedule and shall indicate what part of the design work is at 100% completion. The final design conference will be held after the Government has had seven (7) calendar days after receipt of the submission to review the final design package and supporting data. For smaller packages, especially those involving only one or a few design disciplines the parties may agree on a shorter period.

#### 3.7. FINAL DESIGN REQUIREMENTS

Final design deliverables for a design package shall consist of 100% complete drawings, specifications, submittal register and design analyses for Government review and acceptance. The 100% design submission shall consist of drawings, specifications, updated design analyses and any permits required by the contract for each package submitted. In order to expedite the final design review, prior to the conference, ensure that the design configuration management data and all review comment resolutions are up-to-date. Include the 100% SID and 100% FF&E binders for government approval. The Contractor shall have performed independent technical reviews (ITR's) and back-checks of previous comment resolutions, as required by Section 01 45 04.00 10 CONTRACTOR QUALITY CONTROL, including providing documentation thereof.

##### 3.7.1. Drawings

3.7.1.1. Submit drawings complete with all contract requirements incorporated into the documents to provide a 100% design for each package submitted.

3.7.1.2. Prepare all drawings with the Computer-Aided Design and Drafting (CADD)/Computer-Aided Design (CAD) system, organized and easily referenced electronically, presenting complete construction information.

3.7.1.3. Drawings shall be complete. The Contractor is encouraged to utilize graphics, views, notes, and details which make the drawings easier to review or to construct but is also encouraged to keep such materials to those that are necessary.

3.7.1.4. Provide detail drawings that illustrate conformance with the contract. Include room finish schedules, corresponding color/finish/special items schedules, and exterior finish schedules that agree with the submitted SID binders.



3.7.1.5. The design documents shall be in compliance with the latest version of the A/E/C CADD Standard, available at <https://caddbim.usace.army.mil/CAD>. Use the approved vertical Corps of Engineers title blocks and borders on all drawings with the appropriate firm name included within the title block area.

3.7.1.6. CAD System and Building Information Modeling (BIM) (NOTE: If this is a Single Award or Multiple Award, Indefinite Delivery/Indefinite Quantity Contract, this information will be provided for each task order.)

All CAD files shall be fully compatible with MicroStation V8 or higher. Save all design CAD files as MicroStation V8 or higher files. All submitted BIM Models and associated Facility Data shall be fully compatible with Bentley BIM file format and the USACE Bentley BIM v8 Workspace.

(a) CAD Data Final File Format: During the design development capture geo-referenced coordinates of all changes made to the existing site (facility footprint, utility line installations and alterations, roads, parking areas, etc) as a result of this contract. There is no mandatory methodology for how the geo-referenced coordinates will be captured, however, Engineering and Construction Bulletin No. 2006-15, Subject: Standardizing Computer Aided Design (CAD) and Geographic Information Systems (GIS) Deliverables for all Military Design and Construction Projects identifies the format for final as-built drawings and data sets to be delivered to the government. Close-out requirements at the as-built stage; require final geo-referenced GIS Database of the new facility along with all exterior modifications. The Government will incorporate this data set into the Installation's GIS Masterplan or Enterprise GIS System. See also, Section 01 78 02.00 10 Closeout Submittals.

(b) Electronic Drawing Files: In addition to the native CAD design files, provide separate electronic drawing files (in editable CAD format and Adobe Acrobat PDF version 7.0 or higher) for each project drawing.

(c) Each file (both CAD and PDF) shall represent one complete drawing from the drawing set, including the date, submittal phase, and border. Each drawing file shall be completely independent of any data in any other file, including fonts and shapes not included with the basic CAD software program utilized. Drawing files with external references or special fonts are not acceptable. All displayed graphic elements on all levels of the drawing files shall be part of the project drawing image. The drawing files shall not contain any graphic element that is not part of the drawing image.

(d) Deliver BIM Model and associated Facility Data files in their native format. At a minimum, BIM files shall address major architecture design elements, major structural components, mechanical systems and electrical/communication distribution and elements as defined in Attachment F. See Attachment F for additional BIM requirements.

(e) Drawing Index: Provide an index of drawings sheet in CAD as part of the drawing set, and an electronic list in Microsoft Excel of all drawings on the CD. Include the electronic file name, the sheet reference number, the sheet number, and the sheet title, containing the data for each drawing.

(f) Hard Copies: Plot submitted hard copy drawings directly from the "electronic drawing files" and copy for quantities and sizes indicated in the distribution list at the end of this specification section. The Designers of Record shall stamp, sign and date original hard copy sheets as Released For Construction, and provide copies for distribution from this set.

### 3.7.2. Design Analyses

3.7.2.1. The designers of record shall update, finalize and present design analyses with calculations necessary to substantiate and support all design documents submitted.

3.7.2.2. The responsible DOR shall stamp, sign and date the design analysis. Identify the software used where, applicable (name, version, vendor). Generally, provide design analyses, individually, in an original (file copy) and one copy for the assigned government reviewer.

3.7.2.3. All disciplines review the LEED design analysis in conjunction with their discipline-specific design analysis; include a copy of the separable LEED design analysis in all design analysis submittals.

3.7.2.4. Do not combine multi-disciplined volumes of design-analysis, unless multiple copies are provided to facilitate multiple reviewers (one copy per each separate design analysis included in a volume).

### 3.7.3. Specifications

Specifications shall be 100% complete and in final form.

#### 3.7.4. Submittal Register

Prepare and update the Submittal Register and submit it with the 100% design specifications (see Specification Section 01 33 00, SUBMITTAL PROCEDURES) with each design package. Include the required submittals for each specification section in a design package in the submittal register.

#### 3.7.5. Preparation of DD Form 1354 (Transfer of Real Property)

This form itemizes the types, quantities and costs of various equipment and systems that comprise the project, for the purpose of transferring the new construction project from the Corps Construction Division to the Installation's inventory of real property. The Government will furnish the DB Contractor's design manager a DD Form 1354 checklist to use to produce a draft Form 1354. Submit the completed checklist and prepared draft Form DD 1354 with the 100% design in the Design Analysis. The Corps will use these documents to complete the final DD 1354 upon completion of construction.

#### 3.7.6. Acceptance and Release for Construction

3.7.6.1. At the conclusion of the Final Design Review (after resolutions to the comments have been agreed upon between DOR and Government reviewers), the Contracting Officer or the ACO will accept the Final Design Submission for the design package in writing and allow construction to start for that design package. The Government may withhold acceptance until all major corrections have been made or if the final design submission requires so many corrections, even though minor, that it isn't considered acceptably complete.

3.7.6.2. Government review and acceptance of design submittals is for contract conformance only and shall not relieve the Contractor from responsibility to fully adhere to the requirements of the contract, including the Contractor's accepted contract proposal, or limit the Contractor's responsibility of design as prescribed under Special Contract Requirement: "Responsibility of the Contractor for Design" or limit the Government's rights under the terms of the contract. The Government reserves the right to rescind inadvertent acceptance of design submittals containing contract deviations not separately and expressly identified in the submittal for Government consideration and approval.

### 3.8. DESIGN COMPLETE CONSTRUCTION DOCUMENT REQUIREMENTS

After the Final Design Submission and Review Conference and after Government acceptance of the Final Design submission, revise the design documents for the design package to incorporate the comments generated and resolved in the final review conference, perform and document a back-check review and submit the final, design complete documents. Label the final design complete documents "FOR CONSTRUCTION" or use similar language. In addition to the final drawings and specifications, the following deliverables are required for distribution and field use. The deliverable includes all documentation and supporting design analysis in final form, as well as the final review comments, disposition and the back-check. As part of the quality assurance process, the Government may perform a back-check of the released for construction documentation. Promptly correct any errors or omissions found during the Government back-check. The Government may withhold retainage from progress payments for work or materials associated with a final design package until this submittal has been received and the Government determines that it is complete.

### 3.9. SUBMITTAL DISTRIBUTION, MEDIA AND QUANTITIES

#### 3.9.1. Submittal Distribution and Quantities

General: The documents which the Contractor shall submit to the Government for each submittal are listed and generally described in preceding paragraphs in this Section. Provide copies of each design submittal and design substantiation as follows (NOTE: If this is a Single Award or Multiple Award, Indefinite Delivery/Indefinite Quantity Contract, this information will be provided for each task order):

Activity and Address	Drawing Size (Full Size) <u>half-size</u> Full Sets/ *Partial Sets	Design Analyses & Specs Full Sets/ *Partial Sets	Drawing Size (Half Size) <u>full-size</u> Full Sets/ *Partial Sets	Non-BIM Data CD-ROM or DVD as Necessary (PDF& <u>.dgn</u> )	Furniture Submittal (FFE)	Structural Interior Design Submittal	BIM Data DVD (Per Attach F)
Commander, U.S.Army Engineer District <b>Fort Worth District</b>	5/0	5/0	0/0	2	2	2	2
Commander, U.S.Army Engineer District, Center of Standardization <b>Fort Worth</b>	2/0	2/0	0/0	2	0	0	2
Installation	5/0	5/0	0/0	0	0	0	0
U.S.Army Corps of Engineers Construction Area Office	2/0	2/0	2/0	2	1	1	0
Information Systems Engineering Command (ISEC)	0/0	0/1	0/0	1	1 (Electronic only)	N/A	1
Other Offices	0/0	10/0	10/0	0	0	0	0

**\*NOTE: For partial sets of drawings, specifications and design analyses, see paragraph 3.9.3.3, below.**

**\*\*NOTE: When specified below in 3.9.2, furnish Installation copies of Drawings as paper copies, in lieu of the option to provide secure web-based submittals.**

### 3.9.2. Web based Design Submittals

Except for full or half-sized drawings for Installation personnel, as designated in the Table above, Web based design submittals will be acceptable as an alternative to the paper copies listed in the Table above, provided a single hard-copy PDF based record set is provided to the Contracting Officer for record purposes. Where the contract requires the Contractor to submit documents to permitting authorities, still provide those authorities paper copies (or in an alternate format where required by the authority). Web based design submittal information shall be provided with adequate security and availability to allow unlimited access those specifically authorized to Government reviewers while preventing unauthorized access or modification. File sizes must be of manageable size for reviewers to quickly download or open on their computers. As a minimum, drawings shall be full scale on American National Standards Institute (ANSI) D sheets (34" x 22"). In addition to the optional website, provide the BIM data submission on DVD to each activity and address noted above in paragraph 3.9.1 for each BIM submission required in Attachment F.

### 3.9.3. Mailing of Design Submittals

3.9.3.1. Mail all design submittals to the Government during design and construction, using an overnight mailing service. The Government will furnish the Contractor addresses where each copy shall be mailed to after award of the contract (or individual task order if this is an indefinite delivery/indefinite quantity, task order contract). Mail the submittals to seven (7) different addresses. Assemble drawing sheets, specs, design analyses, etc. into individual sets; do not combine duplicate pages from individual sets so that the government has to assemble a set.

3.9.3.2. Each design submittal shall have a transmittal letter accompanying it indicating the date, design percentage, type of submittal, list of items submitted, transmittal number and point of contact with telephone number.

3.9.3.3. Provide partial sets of drawings, specifications, design analyses, etc., as designated in the Table in paragraph 3.9.1, to those reviewers who only need to review their applicable portions of the design, such as the various utilities. The details of which office receives what portion of the design documentation will be worked out after award.

### 3.10. AS-BUILT DOCUMENTS

Provide as-built drawings and specifications in accordance with Section 01 78 02.00 10, CLOSEOUT SUBMITTALS. Update LEED design phase documentation during construction as needed to reflect construction changes and advancing project completion status (example - Commissioning Plan updates during construction phase) and include updated LEED documentation in construction closeout submittal.

## **ATTACHMENT A STRUCTURAL INTERIOR DESIGN (SID) REQUIREMENTS**

### **1.0 GENERAL INFORMATION**

Structural Interior Design includes all building related elements and components generally part of the building itself, such as wall finishes, ceilings finishes, floor coverings, marker/bulletin boards, blinds, signage and built in casework. Develop the SID in conjunction with the furniture footprint.

### **2.0 STRUCTURAL INTERIOR DESIGN (SID) REQUIREMENTS FOR THE INTERIM AND FINAL DESIGN SUBMITTALS**

#### **2.1. FORMAT AND SCHEDULE**

Prepare and submit for approval an interior and exterior building finishes scheme for an interim design submittal. The DOR shall meet with and discuss the finish schemes with the appropriate Government officials prior to preparation of the schemes to be presented. Present original sets of the schemes to reviewers at an interim design conference.

At the conclusion of the interim phase, after resolutions to the comments have been agreed upon between DOR and Government reviewers, the Contractor may proceed to final design with the interior finishes scheme presented.

The SID information and samples are to be submitted in 8 ½" x 11" format using three ring binders with pockets on the inside of the cover. When there are numerous pages with thick samples, use more than one binder. Large D-ring binders are preferred to O-ring binders. Use page protectors that are strong enough to keep pages from tearing out. Anchor large or heavy samples with mechanical fasteners, Velcro, or double-faced foam tape rather than rubber cement or glue. Fold out items must have a maximum spread of 25 ½". Provide cover and spine inserts sheets identifying the document as "Structural Interior Design" package. Include the project title and location, project number, Contractor/A/E name and phone number(s), submittal stage and date.

Design submittal requirements include, but are not limited to:

##### **2.1.1. Narrative of the Structural Interior Design Objectives**

The SID shall include a narrative that discusses the building related finishes. Include topics that relate to base standards, life safety, sustainable design issues, aesthetics, durability and maintainability, discuss the development and features as they relate to the occupants requirements and the building design.

##### **2.1.2. Interior Color Boards**

Identify and key each item on the color boards to the contract documents to provide a clear indication of how and where each item will be used. Arrange finish samples to the maximum extent possible by room type in order to illustrate room color coordination. Label all samples on the color boards with the manufacturer's name, patterns and colors name and number. Key or code samples to match key code system used on contract drawings.

Material and finish samples shall indicate true pattern, color and texture. Provide photographs or colored photocopies of materials or fabrics to show large overall patterns in conjunction with actual samples to show the actual colors. Finish samples must be large enough to show a complete pattern or design where practical.

Color boards shall include but not be limited to original color samples of the following:

All walls finishes and ceiling finishes, including corner guards, acrylic wainscoting and wall guards/chair rail finishes

All tile information, including tile grout color and tile patterns.

- All flooring finishes, including patterns.
- All door, door frame finishes and door hardware finishes
- All signage, wall base, toilet partitions, locker finishes and operable/folding partitions and trim

- All millwork materials and finishes (cabinets, counter tops, etc.)
- All window frame finishes and window treatments (sills, blinds, etc.)

Color board samples shall reflect all actual finish textures, patterns and colors required as specified. Patterned samples shall be of sufficient size to adequately show pattern and its repeat if a repeat occurs.

#### 2.1.3. Exterior Color Boards

Prepare exterior finishes color boards in similar format as the interior finishes color boards, for presentation to the reviewers during an interim design conference. Provide original color samples of all exterior finishes including but not limited to the following:

- All Roof Finishes
- All Brick and Cast Stone Samples
- All Exterior Insulation and Finish Samples
- All Glass Color Samples
- All Exterior Metals Finishes
- All Window & Door Frame Finishes
- All Specialty Item Finishes, including trim

Identify each item on the exterior finishes color boards and key to the building elevations to provide a clear indication of how and where each item will be used.

### 2.2. STRUCTURAL INTERIOR DESIGN DOCUMENTS

#### 2.2.1. General

Structural interior design related drawings must indicate the placement of extents of SID material, finishes and colors and must be sufficiently detailed to define all interior work. The following is a list of minimum requirements:

#### 2.2.2. Finish Color Schedule

Provide finish color schedule(s) in the contract documents. Provide a finish code, material type, manufacturer, series, and color designations. Key the finish code to the color board samples and drawings.

#### 2.2.3. Interior Finish Plans

Indicate wall and floor patterns and color placement, material transitions and extents of interior finishes.

#### 2.2.4. Furniture Footprint Plans

Provide furniture footprint plans showing the outline of all freestanding and systems furniture for coordination of all other disciplines.

#### 2.2.5. Interior Signage

Include interior signage plans or schedules showing location and quantities of all interior signage. Key each interior sign to a quantitative list indicating size, quantity of each type and signage text.

#### 2.2.6. Interior Elevations, Sections and Details

Indicate material, color and finish placement.

## **ATTACHMENT B FURNITURE, FIXTURES & EQUIPMENT (FF&E) REQUIREMENTS**

### **1.0 FF&E REQUIREMENTS FOR THE INTERIM AND FINAL DESIGN SUBMITTALS**

#### **1.1. FORMAT AND SCHEDULE**

Prepare and submit for approval a comprehensive FF&E scheme for an interim design submittal. The Contractor's interior designer, not a furniture dealer, shall develop the design. FF&E is the selection, layout, specification and documentation of furniture includes but is not limited to workstations, seating, tables, storage and shelving, filing, trash receptacles, clocks, framed artwork, artificial plants, and other accessories. Contract documentation is required to facilitate pricing, procurement and installation. The FF&E package is based on the furniture footprint developed in the Structural Interior Design (SID) portion of the interior design. Develop the FF&E package concurrently with the building design to ensure that there is coordination between the electrical outlets, switches, J-boxes, communication outlets and connections, and lighting as appropriate. In addition, coordinate layout with other building features such as architectural elements, thermostats, location of TV's, GF/GI equipment (for example computers, printers, copiers, shredders, faxes), etc. Locate furniture in front of windows only if the top of the item falls below the window and unless otherwise noted, do not attach furniture including furniture systems to the building. If project has SIPRNET and/or NIPRNET, coordinate furniture layout with SIPRNET and NIPRNET separation requirements. Verify that access required by DOIM for SIPRNET box and conduit is provided. The DOR shall interview appropriate Government personnel to determine FF&E requirements for furniture and furnishings prior to preparation of the scheme to be presented. Determine FFE items and quantities by, but not limited to: (1) the number of personnel to occupy the building, (2) job functions and related furniture/office equipment to support the job function, (3) room functions, (4) rank and grade. Present original sets of the scheme to reviewers at an interim design conference upon completion of the interim architectural submittal or three months prior to the submittal of the final FF&E package (whichever comes first).

Design may proceed to final with the FF&E scheme presented at the conclusion of the interim phase, after resolutions to the comments have been agreed upon between DOR and Government reviewers.

Provide six copies of the electronic versions of all documents upon completion of the final architectural submittal or ten months prior to the contract completion date (whichever comes first), to ensure adequate time for furniture acquisition. Provide unbound, electronic drawings in CAD and BIM. Provide all files needed to view complete drawings. Submit all text documents in Microsoft Word or Excel..

Submit three copies of the final and complete FF&E information and samples in 8 ½" x 11" format using three ring binders with pockets on the inside of the cover upon completion of the final architectural submittal or ten months prior to the contract completion date (whichever comes first). Use more than one binder when there are numerous pages with thick samples. Large D-ring binders are preferred to O-ring binders. Use page protectors that are strong enough to keep pages from tearing out for upholstery and finish boards. Anchor large or heavy samples with mechanical fasteners, Velcro, or double-faced foam tape rather than rubber cement or glue. Fold out items must have a maximum spread of 25 ½". Provide cover and spine inserts sheets identifying the document as "Furniture, Fixtures & Equipment" package and include the project title and location, project number, Contractor/A/E name and phone number(s), submittal stage and date.

Provide electronic copies of all documents upon completion of the final architectural submittal or ten months prior to the contract completion date (whichever comes first), to ensure adequate time for furniture acquisition. Provide six compact disks with all drawings files needed to view the complete drawings unbound and in the latest version AutoCAD. Provide six additional compact disks of all text documents in Microsoft Word or Excel.

Design submittal requirements include, but are not limited to:

##### **1.1.1. Narrative of Interior Design Objectives**

Provide a narrative description of the furniture, to include functional, safety and ergonomic considerations, durability, sustainability, aesthetics, and compatibility with the building design.

##### **1.1.2. Furniture Order Form**

Prepare one Furnishings Order Form for each item specified in the design. This form identifies all information required to order each individual item. In addition to the project name and location, project number, and submittal phase, the order form must include:

- (a) Furniture item illustration and code
- (b) Furniture item name
- (c) Job name, location, and date
- (d) General Services Administration (GSA) FSC Group, part, and section
- (e) Manufacturer, Product name and Product model number or National Stock Number (NSN)
- (f) Finish name and number (code to finish samples)
- (g) Fabric name and number, minimum Wyzenbeek Abrasion Test double rubs (code to fabric samples)
- (h) Dimensions
- (i) Item location by room number and room name
- (j) Quantity per room
- (k) Total quantity
- (l) Special instructions for procurement ordering and/or installation (if applicable)
- (m) Written Product Description: include a non-proprietary paragraph listing the salient features of the item to include but not limited to:
  - (1) required features and characteristics
  - (2) ergonomic requirements
  - (3) functional requirements
  - (4) testing requirements
  - (5) furniture style
  - (6) construction materials
  - (7) minimum warranty

The following is an example for “m” features and characteristics, ergonomic requirements and functional requirements:

Chair Description:

- (1) Mid-Back Ergonomic Task Chair
- (2) Pneumatic Gaslift; Five Star Base
- (3) Mesh Back; Upholstered Seat
- (4) Height and Width Adjustable Task Arms:
  - a. Arm Height: 6”- 11” (+-1/2”)
  - b. Arm Width: 2”– 4” adjustment
- (5) Height Adjustable Lumbar Support
- (6) Adjustable Seat Height 16”-21” (+- 1”)
- (7) Sliding Seat Depth Adjustment 15”-18” (+-1”)
- (8) Standard Hard Casters (for carpeted areas)
- (9) Overall Measurements:
  - a. Overall width: 25” - 27”
  - b. Overall depth: 25”– 28”



(10) Must have a minimum of the following adjustments (In addition to the above):

- a. 360 Degree Swivel
- b. Knee-Tilt with Tilt Tension
- c. Back angle
- d. Forward Tilt
- e. Forward Tilt and Upright Tilt Lock

For projects with systems furniture, also provide a written description of the following minimum requirements:

- (1) Type furniture systems (panel, stacking panels, spine wall, desk based system, or a combination)
- (2) Minimum noise reduction coefficient (NRC)
- (3) Minimum sound transfer coefficient (STC)
- (4) Minimum flame spread and smoke development
- (5) UL testing for task lighting and electrical system
- (6) Panel widths and heights and their locations (this may be done on the drawings) Worksurface types and sizes (this may be done on the drawings)
- (7) Worksurface edge type
- (8) Varying panel/cover finish materials and locations (locations may be shown on the drawings)
- (9) Storage requirements
- (10) Keyboard requirements
- (11) Lock and keying requirements
- (12) Accessory components (examples: tack boards, marker boards, paper management)
- (13) Electrical and communication raceway requirement; type, capacity and location (base, beltline, below and/or above beltline)
- (14) Locations of communication cables (base, beltline, below and/or above beltline, top channel)
- (15) Types of electrical outlets
- (16) Types of communication jacks; provided and installed by others
- (17) Locations of electrical outlets and communication jacks (this may be done on the drawings)
- (18) Type of cable (examples: Cat. 5, Cat. 6, fiber optic; UTP or STP, etc.) system needs to support; provided and installed by others

#### 1.1.3. Alternate Manufacturer List

Provide a table consisting of major furniture items that lists the manufacturers products specified on the Order Form and two alternate manufacturers. Major furniture items include, but are not limited to, casegoods, furniture systems, seating, and tables. Organize matrix by item code and item name. Supply alternates that are available on GSA Schedule and meet the requirements of the Furniture Order Form. One of the two alternates must be from UNICOR if possible. Provide manufacturer name address, telephone number, product series and product name for each alternate manufacturer.

#### 1.1.4. FF&E Procurement List

Provide a table that lists all FF&E furniture, mission unique equipment and building Contractor Furnished/Contractor Installed (CF/CI) items. Give each item a code and name and designate whether item will be procured as part of the FF&E furniture, mission unique equipment or the building construction contract. Use the item code to key all FF&E documents including location plans, color boards, data sheets, cost estimate, etc.

#### 1.1.5. Points of Contact (POCs)

Provide a comprehensive list of POCs needed to implement the FF&E package. This would include but not be limited to appropriate project team members, using activity contacts, interior design representatives, construction contractors and installers involved in the project. In addition to name, address, phone, fax and email, include each contact's job function. Divide the FF&E package into different sections based on this listing, applies to order forms and cost estimates.

#### 1.1.6. Color Boards

Provide color boards for all finishes and fabrics for all FF&E items. Finishes to be included but not limited to paint, laminate, wood finish, fabric, etc.

#### 1.1.7. Itemized Furniture Cost Estimate

Provide an itemized cost estimate of furnishings keyed to the plans and specifications of products included in the package. This cost estimate should be based on GSA price schedules. The cost estimate must include separate line items for general contingency, installation, electrical hook-up for systems furniture or other furniture requiring hardwiring by a licensed electrician, freight charges and any other related costs. Installation and freight quotes from vendors should be use in lieu of a percentage allowance when available. Include a written statement that the pricing is based on GSA schedules. An estimate developed by a furniture dealership may be provided as support information for the estimate, but must be separate from the contractor provided estimate.

### 1.2. INTERIOR DESIGN DOCUMENTS

#### 1.2.1. Overall Furniture and Area Plans

Provide floor Plans showing locations and quantities of all freestanding, and workstation furniture proposed for each floor of the building. Key each room to a large scale Furniture Placement Plan showing the furniture configuration, of all furniture. Provide enlarged area plans with a key plan identifying the area in which the building is located. Key all the items on the drawings by furniture item code. Do not provide manufacturer specific information such as product names and numbers on drawings, Drawings shall be non-proprietary. This is typical for FFE on all plans, including those mentioned below.

#### 1.2.2. Workstation Plans

Show each typical workstation configuration in plan view, elevations or isometric view. Drawings shall illustrate panels and all major components for each typical workstation configuration. Identify workstations using the same numbering system as shown on the project drawings. Key components to a legend on each sheet which identifies and describes the components along with dimensions. Provide the plan, elevations and isometric of each typical workstation together on the same drawing sheet.

#### 1.2.3. Panel Plans

Show panel locations and critical dimensions from finished face of walls, columns, panels including clearances and aisle widths. Key panel assemblies to a legend which shall include width, height, configuration of frames, panel fabric and finishes (if there are different selections existing within a project), powered or non-powered panel and wall mount locations.

#### 1.2.4. Desk Plans

Provide typical free standing desk configurations in plan view, elevation or isometric view and identify components to clearly represent each desk configuration.

#### 1.2.5. Reflected Ceiling Plans

Provide typical plans showing ceiling finishes and heights, lighting fixtures, heating ventilation and air conditioning supply and return, and sprinkler head placement for coordination of furniture.

#### 1.2.6. Electrical and Telecommunication Plans

Show power provisions including type and locations of feeder components, activated outlets and other electrical components. Show locations and quantities of outlets for workstations. Clearly identify different outlets, i.e. electrical, LAN and telecommunication receptacles indicating each type proposed. Show wiring configuration, (circuiting, switching, internal and external connections) and provide as applicable.

#### 1.2.7. Artwork Placement Plans

Provide an Artwork Placement Plan to show location of artwork, assign an artwork item code to each piece of artwork. As an alternative, artwork can be located on the Furniture Plans. Provide a schedule that identifies each piece by room name and number. Provide installation instructions; include mounting height.

#### 1.2.8. Window Drapery Plans

Provide Interior Window Drapery Plans. Key each drapery treatment to a schedule showing color, pattern, material, drapery size and type, draw direction, location and quantities.

### 1.3. FURNITURE SELECTION

1.3.1. Select furniture from the GSA Schedules. Specify furniture available open market when an item is not available on the GSA Schedules. Provide justification for items not available on the GSA Schedules.

1.3.2. To the greatest extent possible when specifying furniture work within a manufacturer's family of furniture for selections, example: Steelcase, Turnstone, Brayton International, Metro, and Vecta are all Steelcase companies. Each alternate should also be specified from a manufacturer's family of furniture, example: first set of alternates would be specified from Knoll's family of furniture and the second from Herman Miller family of furniture. It may be necessary to make some selections from other than a manufacturer's family of furniture if costs are not reasonable for particular items, some items are not available or appropriate for the facility or the items are not on GSA Schedule. If this occurs, consider specifying product from an open line that is accessible by numerous dealerships. Select office furniture including case goods, tables, storage, seating, etc. that is compatible in style, finish and color. Select furniture that complies with ANSI/BIFMA and from manufacturer's standard product line as shown in the most recent published price list and/or amendment and not custom product.

### 1.4. CONSTRUCTION

1.4.1. Provide knee space at workstations and tables that is not obstructed by panels/legs that interfere with knee space of seated person and provide desks, storage and tables with leveling devices to compensate for uneven floors.

1.4.2. Provide worksurface tops constructed to prevent warpage. Provide user friendly features such as radius edges. Do not use sharp edges and exposed connections and ensure the underside of desks, tables and worksurfaces are completely and smoothly finished. Provide abutting worksurfaces that mate closely and are of equal heights when used in side-by-side configurations in order to provide a continuous and level worksurface.

1.4.3. Drawers shall stay securely closed when in the closed position and protect wires from damage during drawer operation. Include a safety catch to prevent accidental removal when fully open.

1.4.4. Unless otherwise noted, specify lockable desks and workstations and storage of steel construction. Use tempered glass glazing when glazing is required.

### 1.5. FINISHES AND UPHOLSTERY

1.5.1. Specify neutral colors for casegoods, furniture systems, storage and tables. Specify desk worksurfaces and table tops that are not too light or too dark in color and have a pattern to help hide soiling. Accent colors are allowed in break and lounge areas. Keep placement of furniture systems panel fabric accent colors to a minimum. All finishes shall be cleanable with ordinary household cleaning solutions.

1.5.2. Use manufacturer's standard fabrics; including textile manufacturers fabrics that have been graded into the furniture manufacturers fabric grades and are available through their GSA Schedule. Customers Own Material

(COM) can be used in headquarter buildings in command suites with executive furniture. Coordinate specific locations with Corps of Engineers Interior Designer.

1.5.3. Specify seating upholstery that meets Wyzenbeek Abrasion Test, 55,000 minimum rubs. Specify a soil retardant finish for woven fabrics if Crypton or vinyl upholstery is not provided for seating in dining areas. Use manufacturer's standard fabrics. This includes textile manufacturers fabrics that have been graded into the furniture manufactures fabric grades and are available through their GSA Schedule. Specify upholstery and finish colors and patterns that help hide soiling. Specify finishes that can be cleaned with ordinary household cleaning solutions.

#### 1.6. ACCESSORIES

1.6.1. Specify all accessories required for completely finished furniture installation. Provide filing cabinets and storage for office supplies. Provide tack surfaces at workstations with overhead storage. Provide tackable surfaces at workstations with overhead storage.

1.6.2. Not Used.

1.6.3. Workstations are to be equipped with stable keyboard trays that have height adjustability, tilting capability, including negative tilt, have a mouse pad at same height as the keyboard tray that can accommodate both left and right handed users, and retractable under worksurface.

#### 1.7. MISSION UNIQUE EQUIPMENT

Funding for FF&E furniture items and mission unique equipment (MUE) items are from two different sources. Separate the designs and procurement documentation for FFE items and MUE. MUE includes, but is not limited to, items such as industrial shelving, workbenches, appliances, fitness equipment, IT equipment and supporting carts. The User will purchase and install mission unique equipment items, unless otherwise noted. Identify locations of known MUE items such as industrial shelving, workbenches, appliances, etc. for space planning purposes.

#### 1.8. SUSTAINABILITY

1.8.1. For all designs provided regardless of facility type, make every effort to implement all aspects of sustainability to the greatest extent possible for all the selections made in the FF&E package. This includes but is not limited to the selection of products that consider: **Material Chemistry and Safety of Inputs** (What chemicals are used in the construction of the selections?); **Recyclability** (Do the selections contain recycled content?); **Disassembly** (Can the selections be disassembled at the end of their useful life to recycle their materials?).

1.8.2. Make selections to the greatest extent possible of products that possess current McDonough Braungart Design Chemistry ([MBDC](#)) certification or other "third-party" certified Cradle to Cradle program, Forest Stewardship Council (FSC) certification, GREENGAURD certification or similar "third-party" certified products consisting of low-emitting materials.

#### 1.9. FURNITURE SYSTEMS

1.9.1. General.

Where appropriate, design furniture systems in open office areas. Coordinate style and color of furniture systems with other storage, seating, etc. in open office areas. Minimize the number of workstation typicals and the parts and pieces required for the design to assist in future reconfiguration and inventorying.

1.9.2. Connector Systems.

Specify a connector system that allows removal of a single panel or spine wall within a typical workstation configuration without requiring disassembly of the workstation or removal of adjacent panels. Specify connector system with tight connections and continuous visual seals. When Acoustical panels are used, provide connector system with continuous acoustical seals. Specify concealed clips, screws, and other construction elements, where possible.

1.9.3. Panels and Spine Walls

Specify panels and spine walls with hinged or removable covers that permit easy access to the raceway when required but are securely mounted and cannot be accidentally dislodged under normal conditions. Panels shall be capable of structurally supporting more than 1 fully loaded component per panel per side. Raceways are to be an integral part of the panel and must be able to support lay-in cabling and have a large capacity for electrical and IT. Do not thread cables through the frame.

#### 1.9.4. Electrical And Information/Technology (IT)

Design furniture with electrical systems that meets requirements of UL 1286 when powered panels are required and UL approved task lights that meet requirements of NFPA 70. Dependent on user requirements and Section 01 10 00, paragraph 3 requirements, it is recommended that workstation electrical and IT wiring entry come from the building walls to eliminate the use of power poles and access at the floor. Design electrical and IT systems that are easily accessed in the spine wall and panels without having to move return panels and components. Electrical and IT management will be easily accessible by removable wall covers which can be removed while workstation components are still attached. Specify connector system that has continuation of electrical and IT wiring within workstations and workstation to workstation.

#### 1.9.5. Pedestals

Specify pedestals that are interchangeable from left to right, and right to left, and retain pedestal locking system capability.

### 1.10. EXECUTIVE FURNITURE

1.10.1. Design for executive furniture in command areas, coordinate specific locations with Corps of Engineers Interior Designer. Use upgraded furniture, upholsteries and finishes in command suites. This includes but is not limited to wood casegoods, seating and tables. Select executive furniture casegoods from a single manufacturer and style line, to include workstations, credenzas, filing, and storage, etc.

1.10.2. Specify furniture with wood veneer finish (except worksurfaces) with mitered solid wood edge of same wood type. Provide worksurface plastic laminate that closely matches adjacent wood veneer. Other executive office furniture such as seating, tables, executive conference room furniture, etc. shall be compatible in style, finish and color with executive furniture casegoods.

#### 1.11. SEATING

##### 1.11.1. General

Specify appropriate chair casters and glides for the floor finish where the seating is located. Universal casters that are appropriate for both hard surface flooring and carpet are preferred. All seating shall support up to a minimum of 250 lbs.

##### 1.11.2. Desk and Guest Seating

Select ergonomic desk chairs with casters, non-upholstered adjustable arms, waterfall front, swivel, tilt, variable back lock, adjustable back height or adjustable lumbar support, pneumatic seat height adjustment, and padded, contoured upholstered seat and back. Desk and guest chair backs may be other than upholstered such as mesh fabric if it is ergonomically designed, forms to back and is comfortable. Depending on scale of desk chair provide seat pan forward and back adjustment to increase or decrease depth of seat pan. All desk chairs shall have an adjustable seat height range of 4 1/2", range to include 16 1/2"-20". Select guest chairs that are compatible in style, finish and color with the desk chairs.

##### 1.11.3. Conference Room Seating

At tables, select ergonomic conference seating with casters, non-upholstered arms, waterfall front, swivel, tilt, pneumatic seat height adjustment, and padded, contoured seat and back, unless otherwise noted. Select arm height and/or design that allows seating to be moved up closely to the table top. Conference chair backs may be other than upholstered such as mesh fabric if it is ergonomically designed, forms to back and is comfortable. Perimeter conference chairs shall be compatible in style, finish and color with conference seating at the tables.

#### 1.11.4. Lounge, Waiting and Reception Area Seating

Select seating with arms and cushioned, upholstered seat and back. In heavy use areas, arms shall be easily cleaned such as non-upholstered arms or upholstered arms with wood arm caps unless otherwise noted.

#### 1.11.5. Break Room Seating

Select stackable seating that is easily cleaned. Seating shall be appropriate for table and counter heights as applicable with non-upholstered arms if arms are required. Chairs shall have metal legs and composite materials for seats.

#### 1.11.6. Lounge, Waiting and Reception Furniture.

Design for end and coffee tables with plastic laminate tops that are compatible in style finish and color with the seating.

#### 1.12. FILING AND STORAGE.

Select storage and shelving units that meet customer's functional load requirements for stored items. Specify counterweights for filing cabinets when required by the manufacturer for stability. File drawers shall allow only one drawer to be opened at a time. Provide heavy duty storage and shelving if information is not available.

#### 1.13. TRAINING TABLES.

Don't use plastic laminate self edge. Training tables shall be reconfigurable, moveable and storable; lighter weight folding with dollies or casters as necessary. Specify dollies if required.

#### 1.14. FURNITURE WARRANTIES.

Specify manufacturer's performance guarantees or warranties that include parts, labor and transportation as follows:

Furniture System, unless otherwise noted – 10 year minimum  
Furniture System Task Lights – 2 year minimum, excluding bulbs  
Furniture System Fabric – 3 year minimum  
Desks - 10 year minimum  
Seating, unless otherwise noted - 10 year minimum  
Seating Mechanisms and Pneumatic Cylinders - 10 years  
Fabric - 3 years minimum  
Filing and Storage - 10 year minimum  
Tables, unless otherwise noted - 10 year minimum  
Table Mechanisms – 5 year  
Table Ganging Device - 1 year  
Items not listed above - 1 year minimum

## **ATTACHMENT C TRACKING COMMENTS IN DRCHECKS**

### **1.0 General**

The Government and DB Contractor shall set up the project in Dr Checks. Throughout the design process, the parties shall enter, track, and back-check comments using the DrChecks system. Government reviewers enter design review comments into DrChecks. Designers of Record shall annotate comments timely and specifically to indicate exactly what action will be taken or why the action is not required. Comments considered critical by the conference participants shall be flagged as such.

### **2.0 DrChecks Review Comments**

The Contractor and the Government shall monitor DrChecks to assure all comments are annotated and agreed to by the designers and reviewers prior to the next submittal. The DrChecks comments and responses shall be printed and included in the design analysis for record.

2.1. Conference participants (reviewers) will expect coordination between Design Analysis calculations and the submitted design. Reviewers will also focus on the design submittal's satisfaction of the contract requirements.

2.2. The Designers of Record shall answer each comment in DrChecks with a formal response prior to the next submittal, clearly indicating what action will be taken and what drawing/spec will change. Designers of Record are encouraged to directly contact reviewers to discuss and agree to the formal comment responses rather than relying only on DrChecks and review meetings to discuss comments. With the next design conference, reviewers will back-check answers to the comments against the submittal, in addition to reviewing additional design work.

2.3. Comments that, in the DB Contractor's opinion, require effort outside the scope of the contract shall be clearly indicated as such in DrChecks. The DB Contractor shall not proceed with work outside the contract until a modification to the contract is properly executed, if one is necessary.

### **3.0 DrChecks Initial Account Set-Up**

To initialize an office's use of DrChecks, choose a contact person within the office to call the DrChecks Help Desk at 800-428-HELP, M-F, 8AM-5PM, Central time. This POC will be given an office password to distribute to others in the office. Individuals can then go to the hyperlink at <http://www.projnet.org> and register as a first time user. Upon registration, each user will be given a personal password to the DrChecks system.

3.1. Once the office and individuals are registered, the COE's project manager or lead reviewer will assign the individuals and/or offices to the specific project for review. At this point, persons assigned can make comments, annotate comments, and close comments, depending on their particular assignment.

### **4.0 DrChecks Reviewer Role**

The Contractor is the technical reviewer and the Government is the compliance reviewer of the DB designers design documents. Each reviewer enters their own comments into the Dr Checks system. To enter comments:

4.1. Log into DrChecks.

4.2. Click on the appropriate project.

4.3. Click on the appropriate review conference. An Add comment screen will appear.

4.4. Select or fill out the appropriate sections (particularly comment discipline and type of document for sorting) of the comment form and enter the comment in the space provided.

4.5. Click the Add Comment button. The comment will be added to the database and a fresh screen will appear for the next comment you have.

4.6. Once comments are all entered, exit DrChecks by choosing "My Account" and then Logout.

## **5.0 DrChecks Comment Evaluation**

The role of the designers of record is to evaluate and respond to the comments entered by the Government reviewers and by the DB Contractor. To respond to comments:

5.1. Log into DrChecks.

5.2. Click on the appropriate project.

5.3. Under "Evaluate" click on the number under "Pending".

5.4. Locate the comments that require your evaluation. (Note: If you know the comment number you can use the Quick Pick window on your home page in DrChecks; enter the number and click on go.)

5.5. Select the appropriate evaluation (concur, non-concur, for information only, or check and resolve) and add the response.

5.6. Click on the Add button. The evaluation will be added to the database and a fresh screen will appear with the next comment.

5.7. Once evaluations are all entered, exit DrChecks by choosing "My Account" and then Logout.

## **6.0 DrChecks Back-check**

At the following design conference, participants will back-check comment annotations against newly presented documents to verify that the designers' responses are acceptable and completed. The Contractor and Government reviewers shall either enter additional back-check comments, as necessary or close those that are resolved as a result of the design conferences:

6.1. Log into DrChecks.

6.2. Click on the appropriate project.

6.3. Under "My Backcheck" click on the number under "Pending".

6.4. If you agree with the designer's response select "Close Comment" and add a closing response if desired.

6.5. If you do not agree with the designer's response or the submittal does not reflect the response given, select "Issue Open", enter additional information.

6.6. Click on the Add button. The back-check will be added to the database and a fresh screen will appear with the next comment.

6.7. Once back-checks are all entered, exit DrChecks by choosing "My Account" and then Logout. The design is completed and final when there are no pending comments to be evaluated and there are no pending or open comments under back-check.



**ATTACHMENT D**  
**SAMPLE FIRE PROTECTION AND LIFE SAFETY CODE REVIEW**

Instructions: Use the information outlined in this document to provide the minimum requirement for development of Fire Protection and Life Safety Code submittals for all building projects. Additional and supplemental information may be used to further develop the code review. Insert N/A after criteria, which may be "not applicable".

**1.0 SAMPLE FIRE PROTECTION AND LIFE SAFETY CODE REVIEW**

- 1.1. Project Name (insert name and location)
- 1.2. Applicable Codes and Standards
  - 1.2.1. Unified Facilities Criteria (UFC): 3-600-01, Design: Fire Protection Engineering For Facilities
  - 1.2.2. International Building Code (IBC) for fire resistance requirements, allowable floor area, building height limitations and building separation distance requirements, except as modified by UFC 3-600-01.
  - 1.2.3. National Fire Protection Association (NFPA) 101 Life Safety Code (latest edition), for building egress and life safety and applicable criteria in UFC 3-600-01.
  - 1.2.4. ADA and ABA Accessibility Guidelines. For Buildings and Facilities See Section 01 10 00, Paragraph 3 for facility specific criteria.
- 1.3. Occupancy Classification  
IBC chapters 3 and 4
- 1.4. Construction Type  
IBC chapter 6
- 1.5. Area Limitations  
IBC chapter 5, table 503
- 1.6. Allowable Floor Areas  
IBC section 503, 505
- 1.7. Allowable area increases  
IBC section 506, 507
- 1.8. Maximum Height of Buildings  
IBC section 504
- 1.9. Fire-resistive substitution
- 1.10. Occupancy Separations  
IBC table 302.3.2
- 1.11. Fire Resistive Requirements
  - 1.11.1. Exterior Walls - [ ] hour rating, IBC table 601, 602
  - 1.11.2. Interior Bearing walls - [ ] hour rating
  - 1.11.3. Structural frame - [ ] hour rating
  - 1.11.4. Permanent partitions - [ ] hour rating

- 1.11.5. Shaft enclosures - [ ] hour rating
- 1.11.6. Floors & Floor-Ceilings - [ ] hour rating
- 1.11.7. Roofs and Roof Ceilings - [ ] hour rating
- 1.12. Automatic Sprinklers and others used to determine the need for automatic Extinguishing Equipment, Extinguishing Systems, Foam Systems, Standpipe
  - 1.12.1. UFC 3-600-01, chapters 4 and 6 systems, wet chemical systems, etc. State which systems are required and to what criteria they will be designed.
  - 1.12.2. UFC 3-600-01, Appendix B Occupancy Classification. Note the classification for each room. This may be accomplished by classifying the entire building and noting exceptions for rooms that differ (E.g. The entire building is Light Hazard except boiler room and storage rooms which are [ ], etc.)
  - 1.12.3. UFC 3-600-01, Chapter 3 Sprinkler Design Density, Sprinkler Design Area, Water Demand for Hose Streams (supply pressure and source requirements).
  - 1.12.4. UFC 3-600-01, Chapter 4 Coverage per sprinkler head. Extended coverage sprinkler heads are not permitted.
  - 1.12.5. Available Water Supply. Provide the results of the water flow tests showing the available water supply static pressure and residual pressure at flow. Based on this data and the estimated flow and pressure required for the sprinkler system, determine the need for a fire pump.
  - 1.12.6. NFPA 13, Para. 8.16.4.6.1. Provide backflow preventer valves as required by the local municipality, authority, or water purveyor. Provide a test valve located downstream of the backflow preventer for flow testing the backflow preventer at full system demand flow. Route the discharge to an appropriate location outside the building.
- 1.13. Kitchen Cooking Exhaust Equipment  
Describe when kitchen cooking exhaust equipment is provided for the project. Type of extinguishing systems for the equipment should be provided. per NFPA 96. Show all interlocks with manual release switches, fuel shutoff valves, electrical shunt trips, exhaust fans, and building alarms.
- 1.14. Portable Fire Extinguishers, fire classification and travel distance. per NFPA 10
- 1.15. Enclosure Protection and Penetration Requirements. - Opening Protectives and Through Penetrations
  - 1.15.1. IBC Section 712, 715 and Table 715.3. Mechanical rooms, exit stairways, storage rooms, janitor [ ] hour rating. IBC Table 302.1.1
  - 1.15.2. Fire Blocks, Draft Stops, Through Penetrations and Opening Protectives
- 1.16. Fire Dampers. Describe where fire dampers and smoke dampers are to be used (IBC Section 716 and NFPA 90A). State whether isolation smoke dampers are required at the air handler.
- 1.17. Detection Alarm and Communication. UFC 3-600-01, (Chapter 5); NFPA 101 para. 3.4 (chapters 12-42); NFPA 72
- 1.18. Mass Notification. Describe building/facility mass notification system (UFC 4-021-01) type and type of base-wide mass notification/communication system. State whether the visible notification appliances will be combined with the fire alarm system or kept separate. (Note: Navy has taken position to combine visible notification appliances with fire alarm).
- 1.19. Interior Finishes (classification). NFPA 101.10.2.3 and NFPA 101.7.1.4
- 1.20. Means of Egress

- 1.20.1. Separation of Means of Egress, NFPA 101 chapters 7 and 12-42; NFPA101.7.1.3
- 1.20.2. Occupant Load, NFPA101.7.3.1 and chapters 12-42.
- 1.20.3. Egress Capacity (stairs, corridors, ramps and doors) NFPA101.7.3.3
- 1.20.4. Number of Means of Egress, NFPA101.7.4 and chapters 12-42.
- 1.20.5. Dead end limits and Common Path of Travel, NFPA 101.7.5.1.6 and chapters 12-42.
- 1.20.6. Accessible Means of Egress (for accessible buildings), NFPA101.7.5.4
- 1.20.7. Measurement of Travel Distance to Exits, NFPA101.7.6 and chapters 12-42.
- 1.20.8. Discharge from Exits, NFPA101.7.7.2
- 1.20.9. Illumination of Means of Egress, NFPA101.7.8
- 1.20.10. Emergency Lighting, NFPA101.7.9
- 1.20.11. Marking of Means of Egress, NFPA101.7.10
- 1.21. Elevators, UFC 3-600-01, Chapter 6; IBC and ASME A17.1 - 2000,(Safety Code for Elevators and Escalators)
- 1.22. Accessibility Requirements, ADA and ABA Accessibility Guidelines for Buildings and Facilities
- 1.23. Certification of Fire Protection and Life Safety Code Requirements. (Note: Edit the Fire team membership if necessary). Preparers of this document certify the accuracy and completeness of the Fire Protection and Life Safety features for this project in accordance with the attached completed form(s).
- 1.24. Designer of Record. Certification of Fire protection and Life Safety Code Requirements. (Note: Edit the Fire team members if necessary). Preparers of this document certify the accuracy and completeness of the Fire Protection and Life Safety features of this project.

Fire Protection Engineer of Record:

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Signature and Stamp

Date

OR

Architect of Record:

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Signature and Stamp

Date

Mechanical Engineer of Record:

---

Signature and Stamp

Date

Electrical Engineer of Record:

Wednesday, June 16, 2010

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Signature/Date

**ATTACHMENT E**  
**LEED SUBMITTALS**

LEED Credit Paragraph	Contractor Check Here if Credit is Claimed	LEED-NC v3 Submittals (OCT09)	Provide for Credit Audit Only		Date Submitted (to be filled in by Contractor)	Government Reviewer's Use
PAR		FEATURE	DUE AT	REQUIRED DOCUMENTATION	DATE	REV
<b>GENERAL</b>						
		GENERAL - All calculations shall be in accordance with LEED 2009 Reference Guide.				
		GENERAL: Obtain excel version of this spreadsheet at <a href="http://en.sas.usace.army.mil/enWeb/EngineeringCriteria">http://en.sas.usace.army.mil/enWeb/EngineeringCriteria</a> .				
		GENERAL - For all credits, narrative/comments may be added to describe special circumstances or considerations regarding the project's credit approach.				
		GENERAL - Include all required LEED drawings indicated below in contract drawings with applicable discipline drawings, labeled For Reference Only.				
		NOTE: Each submittal indicated with "****" differs from LEED certified project submittals by either having a different due date or being an added submittal not required by GBCI.				
		NOTE: Projects seeking LEED certification need only submit to GBCI whatever documentation is acceptable to GBCI (for example, licensed professional certifications). This checklist identifies what must be submitted to the Government for internal review purposes. Government review of LEED documentation in no way supercedes or modifies the requirements and rulings of GBCI for purposes of compliance with project requirement to obtain LEED certification.				
		GENERAL - Audit documentation may include but is not limited to what is indicated in this table.				
			Closeout	List of all Final Design submittals revised after final design to reflect actual closeout conditions. Revised Final Design submittals. - OR - Statement confirming that no changes have been made since final design that effect final design submittal documents.		Proj Engr (PE)
<b>CATEGORY 1 - SUSTAINABLE SITES</b>						
SSPR1		Construction Activity Pollution Prevention (PREREQUISITE)	**Final Design	List of drawings and specifications that address the erosion control, particulate/dust control and sedimentation control measures to be implemented.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			**Final Design	Narrative that indicates which compliance path was used (NPDES or Local standards) and describes the measures to be implemented on the project. If a local standard was followed, provide specific information to demonstrate that the local standard is equal to or more stringent than the NPDES program.		CIV
SS1		Site Selection	Final Design	Statement confirming that project does not meet any of the prohibited criteria.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design	LEED Site plan drawing that shows all proposed development, line depicting boundary of all bodies of water and/or wetlands within 100 feet of project boundary and a line depicting 5' elevation above 100 year flood line that falls within project boundary. Not required if neither condition applies.		CIV
SS2		Development Density & Community Connectivity	Final Design	Option 1: LEED Site vicinity plan showing project site and surrounding development. Show density boundary or note drawing scale.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design	Option 1: Table indicating, for project site and all surrounding sites within density radius (keyed to site vicinity plan), site area and building area. Project development density calculation. Density radius calculation. Development density calculation within density radius.		CIV
			Final Design	Option 2: LEED Site vicinity plan showing project site, the 1/2 mile community radius, pedestrian walkways and the locations of the residential development(s) and Basic Services surrounding the project site.		CIV
			Final Design	Option 2: List (including business name and type) of all Basic Services facilities within the 1/2 mile radius, keyed to site vicinity plan.		CIV
SS3		Brownfield Redevelopment	Final Design	Narrative describing contamination and the remediation activities included in project. Include statement indicating how site was determined to be a brownfield.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
SS4.1		Alternative Transportation: Public Transportation Access	Final Design	Statement indicating which option for compliance applies. State whether public transportation is existing or proposed and, if proposed, cite source of this information.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design	Option 1: LEED Site vicinity plan showing project site, mass transit stops and pedestrian path to them with path distance noted.		CIV
			Final Design	Option 2: LEED Site vicinity plan showing project site, bus stops and pedestrian path to them with path distance noted.		CIV
SS4.2		Alternative Transportation: Bicycle Storage & Changing Rooms	Final Design	FTE calculation. Bicycle storage spaces calculation. Shower/changing facilities calculation.		CIV
			Final Design	List of drawings that show the location(s) of bicycle storage areas. Statement indicating distance from building entrance.		CIV
			Final Design	List of drawings that show the location(s) of shower/changing facilities and, if located outside the building, statement indicating distance from building entrance.		CIV

Wednesday, June 16, 2010

LEED Credit Paragraph	Contractor Check Here if Credit is Claimed	LEED-NC v3 Submittals (OCT09)	Provide for Credit Audit Only		Date Submitted (to be filled in by Contractor)	Government Reviewer's Use
PAR		FEATURE	DUE AT	REQUIRED DOCUMENTATION	DATE	REV
SS4.3		Alternative Transportation: Low Emitting & Fuel Efficient Vehicles	Final Design	Statement indicating which option for compliance applies. FTE calculation. Statement indicating total parking capacity of site.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design	Option 1: Low-emission & fuel-efficient vehicle calculation.		CIV
			Final Design	Option 1: List of drawings and specification references that show location and number of preferred parking spaces for low-emission & fuel-efficient vehicles and signage.		CIV
			Final Design	Option 1: Statement indicating quantity, make, model and manufacturer of low-emission & fuel-efficient vehicles to be provided. Statement confirming vehicles are zero-emission or indicating ACEEE vehicle scores.		CIV
			Final Design	Option 2: Low-emission & fuel-efficient vehicle parking calculation.		CIV
			Final Design	Option 2: List of drawings and specification references that show location and number of preferred parking spaces and signage.		CIV
			Final Design	Option 3: Low-emission & fuel-efficient vehicle refueling station calculation.		CIV
			Final Design	Option 3: List of drawings and specifications indicating location and number of refueling stations, fuel type and fueling capacity for each station for an 8-hour period.		CIV
			Closeout	X Option 3: Construction product submittals indicating what was provided and confirming compliance with respect to fuel type and fueling capacity for each station for an 8-hour period.		CIV
SS4.4		Alternative Transportation: Parking Capacity	Final Design	Statement indicating which option for compliance applies.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design	Option 1: Preferred parking calculation including number of spaces required, total provided, preferred spaces provided and percentage.		CIV
			Final Design	Option 2: FTE calculation. Preferred parking calculation including number of spaces provided, preferred spaces provided and percentage.		CIV
			Final Design	Options 1 and 2: List of drawings and specification references that show location and number of preferred parking spaces and signage.		CIV
			Final Design	Option 3: Narrative indicating number of spaces required and provided and describing infrastructure and support programs with description of project features to support them.		CIV
SS5.1		Site Development: Protect or Restore Habitat	**Final Design	Option 1: List of drawing and specification references that convey site disturbance limits.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			**Final Design	Option 2: LEED site plan drawing that delineates boundaries of each preserved and restored habitat area with area (sf) noted for each.		CIV
			**Final Design	Option 2: Percentage calculation of restored/preserved habitat to total site area. List of drawings and specification references that convey restoration planting requirements.		CIV
SS5.2		Site Development: Maximize Open Space	Final Design	Option 2: LEED site plan drawing delineating boundary of vegetated open space adjacent to building with areas of building footprint and designated open space noted.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
SS6.1		Stormwater Design: Quantity Control	Final Design	Statement indicating which option for compliance applies.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design	Option 1: Indicate pre-development and post-development runoff rate(cfs) and runoff quantity (cf) -OR - Narrative describing site conditions, measures and controls to be implemented to prevent excessive stream velocities and erosion.		CIV
			Final Design	Option 2: Indicate pre-development and post-development runoff rate(cfs) and runoff quantity (cf). Indicate percent reduction in each.		CIV
SS6.2		Stormwater Design: Quality Control	Final Design	For non-structural controls, list all BMPs used and, for each, describe the function of the BMP and indicate the percent annual rainfall treated. List all structural controls and, for each, describe the pollutant removal and indicate the percent annual rainfall treated.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
SS7.1		Heat Island Effect: Non-Roof	**Final Design	LEED site plan drawing indicating locations and quantities of each paving type, including areas of shaded pavement. Percentage calculation indicating percentage of reflective/shaded/open grid area.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV

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SS7.2		Heat Island Effect: Roof	Final Design	Option 1: Percentage calculation indicating percentage of SRI compliant roof area. List of drawings and specification references that convey SRI requirements and roof slopes.		ARC
			Final Design	Option 1: List of specified roof materials indicating, for each, type, manufacturer, product name and identification if known, SRI value and roof slope.		ARC
			**Closeout	Option 1: List of installed roof materials indicating, for each, manufacturer, product name and identification, SRI value and roof slope.		PE
			Closeout	X Option 1: Manufacturer published product data or certification confirming SRI		PE
			Final Design	Option 2: Percentage calculation indicating percentage of vegetated roof area.		ARC
			Final Design	Option 3: Combined reflective and green roof calculation.		ARC
			Final Design	Option 3: List of specified roof materials indicating, for each, type, manufacturer, product name and identification if known, SRI value and roof slope.		ARC
			**Closeout	Option 3: List of installed roof materials indicating, for each, manufacturer, product name and identification, SRI value and roof slope.		PE
			Closeout	X Option 3: Manufacturer published product data or certification confirming SRI		PE
SS8		Light Pollution Reduction	Final Design	Interior Lighting: List of drawings and specification references that convey interior lighting requirements (location and type of all installed interior lighting, location of non-opaque exterior envelope surfaces, allowing confirmation that maximum candela value from interior fixtures does not intersect non-opaque building envelope surfaces). - OR - List of drawings and specification references that show automatic lighting controls compliance with credit requirement.		ELEC
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		ELEC
			Final Design	Exterior Lighting: List of drawings and specification references that convey exterior lighting requirements (location and type of all site lighting and building façade/landscape lighting).		ELEC
			Final Design	Exterior Site Lighting Power Density (LPD): Tabulation for exterior site lighting indicating, for each location identification or description, units of measure, area or distance of the location, actual LPD using units consistent with ASHRAE 90.1, and the ASHRAE allowable LPD for that type of location. Percentage calculation of actual versus allowable LPD for all site lighting.		ELEC
			Final Design	Exterior Building Facade/Landscape Lighting Power Density (LPD): Tabulation for exterior building facade/landscape lighting indicating, for each location identification or description, units of measure, area or distance of the location, actual LPD using units consistent with ASHRAE 90.1, and the ASHRAE allowable LPD for that type of location. Percentage calculation of actual versus allowable LPD for all building facade/landscape lighting.		ELEC
			Final Design	Exterior Lighting IESNA Zone: Indicate which IESNA zone is applicable to the project.		ELEC
			Final Design	Exterior Lighting Site Lumen table indicating, for each fixture type, quantity installed, initial lamp lumens per luminaire, initial lamp lumens above 90 degrees from Nadir, total lamp lumens and total lamp lumens above 90 degrees. Percentage of site lamp lumens above 90 degrees from nadir to total lamp lumens.		ELEC
			Final Design	Exterior Lighting Narrative describing analysis used for addressing requirements for light trespass at site boundary and beyond.		ELEC
<b>CATEGORY 2 – WATER EFFICIENCY</b>						
WEPR1		Water Use Reduction: 20% Reduction	Final Design	Statement confirming which occupancy breakdown applies (default or special). For special occupancy breakdown, indicate source and explanation for ratio.		MEC
			Final Design	Occupancy calculation including male/female numbers for FTEs, visitors, students, customers, residential and other type occupants/users		MEC
			Final Design	Statement indicating percent of male restrooms with urinals. Statement indicating annual days of operation.		MEC

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			Final Design	Baseline flush fixture calculation spreadsheet indicating, for each fixture type, gender, flush rate, daily uses per person for each occupant type identified in occupancy calculation and annual baseline flush fixture water usage.		MEC
			Final Design	Design case flush fixture calculation spreadsheet indicating, for each fixture type, gender, fixture manufacturer, fixture model number, flush rate, percent of occupants using this fixture type, daily uses per person for each occupant type identified in occupancy calculation and annual design case flush fixture water usage.		MEC
			Closeout	X Manufacturer published product data or certification confirming fixture water usage.		PE
WE1.1		Water Efficient Landscaping: Reduce by 50%	Final Design	Statement indicating which option for compliance applies.		CIV
			**Final Design	Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design	Calculation indicating, for baseline and design case, total water applied, total potable water applied, total non-potable water applied. Design case percent potable water reduction. If nonpotable water is used, indicate source of nonpotable water.		CIV
			Final Design	List of landscape plan drawings.		CIV
			Final Design	Narrative describing landscaping and irrigation design strategies, including water use calculation methodology used to determine savings and, if non-potable water is used, specific information about source and available quantity.		CIV
WE1.2		Water Efficient Landscaping: No Potable Water Use or No Irrigation	Same as WE1.1	Same as WE1.1		CIV
WE2		Innovative Wastewater Technologies	Final Design	Statement confirming which option for compliance applies.		MEC
			Final Design	Statement confirming which occupancy breakdown applies (default or special). For special occupancy breakdown, indicate source and explanation for ratio.		MEC
			Final Design	Occupancy calculation including male/female numbers for FTEs, visitors, students, customers, residential and other type occupants/users		MEC
			Final Design	Statement indicating percent of male restrooms with urinals. Statement indicating annual days of operation.		MEC
			Final Design	Baseline flush fixture calculation spreadsheet indicating, for each fixture type, gender, flush rate, daily uses per person for each occupant type identified in occupancy calculation and annual baseline flush fixture water usage.		MEC
			Final Design	Design case flush fixture calculation spreadsheet indicating, for each fixture type, gender, fixture manufacturer, fixture model number, flush rate, percent of occupants using this fixture type, daily uses per person for each occupant type identified in occupancy calculation and annual design case flush fixture water usage.		MEC
			Final Design	Option 1: If onsite non-potable water is used, identify source(s), indicate annual quantity from each source and indicate total annual quantity from all onsite non-potable water sources.		MEC
			Final Design	Option 1: Summary calculation indicating baseline annual water consumption, design case annual water consumption, non-potable annual water consumption and total percentage annual water savings.		MEC
			Final Design	Option 2: Statement confirming on-site treatment of all generated wastewater to tertiary standards and all treated wastewater is either infiltrated or used on-site.		MEC
			Final Design	Option 2: List of drawing and specification references that convey design of on-site wastewater treatment features.		CIV
			Final Design	Option 2: On-site water treatment quantity calculation indicating all on-site wastewater source(s), annual quantity treated, annual quantity infiltrated and annual quantity re-used on site from each source and totals for annual quantity treated, annual quantity infiltrated and annual quantity re-used on site from all sources.		CIV
			Final Design	Option 2: Wastewater summary calculation indicating design case annual flush fixture water usage, annual on-site water treatment and percentage sewage conveyance reduction.		MEC
			Final Design	Narrative describing project strategy for reduction of potable water use for sewage conveyance, including specific information on reclaimed water usage and treated wastewater usage.		MEC
WE3		Water Use Reduction: 30% - 40% Reduction	Same as WEPR1	Same as WEPR1		MEC

## CATEGORY 3 – ENERGY AND ATMOSPHERE

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EAPR1		Fundamental Commissioning of the Building Energy Systems (PREREQUISITE)	**Final Design	**Owner's Project Requirements document		ALL
			**Final Design	**Basis of Design document for commissioned systems		MEC, ELEC
			**Final Design	**Commissioning Plan		MEC, ELEC
			Closeout	Statement confirming all commissioning requirements have been incorporated into construction documents.		PE
			Closeout	Commissioning Report		PE
EAPR2		Minimum Energy Performance (PREREQUISITE)	Final Design	Statement listing the mandatory provisions of ASHRAE 90.1 that project meets relative to compliance with this prerequisite and indicating which compliance path was used.		MEC ELEC ARC
			Final Design	Statement indicating which compliance path option applies.		MEC
			Final Design	Option 1: Statement confirming simulation software capabilities and confirming assumptions and methodology.		MEC
			Final Design	Option 1: General information including simulation program, principal heating source, percent new construction and renovation, weather file, climate zone and Energy Star Target Finder score.		MEC
			Final Design	Option 1: Space summary listing, for each building use, the conditioned area, unconditioned area and total area and include total area for each category		MEC
			Final Design	Option 1: List of all simulation output advisory message data and show difference between baseline and proposed design		MEC
			Final Design	Option 1: Comparison summary for energy model inputs including description of baseline and design case energy model inputs, showing both by element type		MEC
			Final Design	Option 1: Energy type summary listing, for each energy type, utility rate description, units of energy and units of demand		MEC
			Final Design	Option 1: Statement indicating whether project uses on-site renewable energy. If yes, list all sources and indicate, for each source, backup energy type, annual energy generated, rated capacity and renewable energy cost		MEC
			Final Design	Option 1: If analysis includes exceptional calculation methods, statement describing how exceptional calculation measure cost savings is determined		MEC
			Final Design	Option 1: If analysis includes exceptional calculation methods, for each exceptional calculation method indicate energy types and, for each energy type, annual energy savings, annual cost savings, and brief descriptive narrative		MEC
			Final Design	Option 1: Baseline performance rating compliance report table indicating, for each energy end use, whether it is a process load, energy type, annual and peak energy demand for all four orientations. For each orientation indicate total annual energy use for each orientation and total annual process energy use.		MEC
			Final Design	Option 1: Baseline energy cost table indicating, for each energy type, annual cost for all four orientations and building total energy cost.		MEC
			Final Design	Option 1: Proposed Design performance rating compliance report table indicating, for each energy end use, whether it is a process load, energy type, annual and peak energy demand, baseline annual and peak energy demand and percent savings. Indicate total annual energy use and total annual process energy use for both proposed design and baseline and percent savings.		MEC
			Final Design	Option 1: Proposed Design energy cost table indicating, for each energy type, annual cost for all four orientations and building total energy cost.		MEC
			Final Design	Option 1: Energy cost and consumption by energy type report indicating, for each energy type, proposed design and baseline annual use and annual cost, percent savings annual use and annual cost. Indicate for renewable energy annual energy generated and annual cost. Indicate exceptional calculations annual energy savings and annual cost savings. Indicate building total annual energy use, annual energy cost for proposed design and baseline and indicate percent savings annual energy use and annual energy cost.		MEC

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			Final Design	Option 1: Compliance summaries from energy simulation software. If software does not produce compliance summaries provide output summaries and example input summaries for baseline and proposed design supporting data in the tables. Output summaries must include simulated energy consumption by end use and total energy use and cost by energy type. Example input summaries should represent most common systems and must include occupancy, use pattern, assumed envelope component sizes and descriptive features and assumed mechanical equipment types and descriptive features		MEC
			Final Design	Option 1: Energy rate tariff from project energy providers (only if not using LEED Reference Guide default rates)		MEC
EAPR3		Fundamental Refrigerant Management (PREREQUISITE)	Final Design	Statement indicating which option for compliance applies.		MEC
			Final Design	Option 2: Narrative describing phase out plan, including specific information on phase out dates and refrigerant quantities.		MEC
EA1		Optimize Energy Performance	Final Design	Statement indicating which compliance path option applies.		MEC
			Final Design	Option 1: Statement confirming simulation software capabilities and confirming assumptions and methodology.		MEC
			Final Design	Option 1: General information including simulation program, principal heating source, percent new construction and renovation, weather file, climate zone and Energy Star Target Finder score.		MEC
			Final Design	Option 1: Space summary listing, for each building use, the conditioned area, unconditioned area and total area and include total area for each category		MEC
			Final Design	Option 1: List of all simulation output advisory message data and show difference between baseline and proposed design		MEC
			Final Design	Option 1: Comparison summary for energy model inputs including description of baseline and design case energy model inputs, showing both by element type		MEC
			Final Design	Option 1: Energy type summary listing, for each energy type, utility rate description, units of energy and units of demand		MEC
			Final Design	Option 1: Statement indicating whether project uses on-site renewable energy. If yes, list all sources and indicate, for each source, backup energy type, annual energy generated, rated capacity and renewable energy cost		MEC
			Final Design	Option 1: If analysis includes exceptional calculation methods, statement describing how exceptional calculation measure cost savings is determined		MEC
			Final Design	Option 1: If analysis includes exceptional calculation methods, for each exceptional calculation method indicate energy types and, for each energy type, annual energy savings, annual cost savings, and brief descriptive narrative		MEC
			Final Design	Option 1: Baseline performance rating compliance report table indicating, for each energy end use, whether it is a process load, energy type, annual and peak energy demand for all four orientations. For each orientation indicate total annual energy use for each orientation and total annual process energy use.		MEC
			Final Design	Option 1: Baseline energy cost table indicating, for each energy type, annual cost for all four orientations and building total energy cost.		MEC
			Final Design	Option 1: Proposed Design performance rating compliance report table indicating, for each energy end use, whether it is a process load, energy type, annual and peak energy demand, baseline annual and peak energy demand and percent savings. Indicate total annual energy use and total annual process energy use for both proposed design and baseline and percent savings.		MEC
			Final Design	Option 1: Proposed Design energy cost table indicating, for each energy type, annual cost for all four orientations and building total energy cost.		MEC
			Final Design	Option 1: Energy cost and consumption by energy type report indicating, for each energy type, proposed design and baseline annual use and annual cost, percent savings annual use and annual cost. Indicate for renewable energy annual energy generated and annual cost. Indicate exceptional calculations annual energy savings and annual cost savings. Indicate building total annual energy use, annual energy cost for proposed design and baseline and indicate percent savings annual energy use and annual energy cost.		MEC

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			Final Design	Option 1: Compliance summaries from energy simulation software. If software does not produce compliance summaries provide output summaries and example input summaries for baseline and proposed design supporting data in the tables. Output summaries must include simulated energy consumption by end use and total energy use and cost by energy type. Example input summaries should represent most common systems and must include occupancy, use pattern, assumed envelope component sizes and descriptive features and assumed mechanical equipment types and descriptive features		MEC
			Final Design	Option 1: Energy rate tariff from project energy providers (only if not using LEED Reference Guide default rates)		MEC
EA2.1		On-Site Renewable Energy	Final Design	Statement indicating which compliance path option applies.		ELEC
			Final Design	List all on-site renewable energy sources and indicate, for each source, backup energy type, annual energy generated, rated capacity and renewable energy cost. Indicate total annual energy use (all sources), total annual energy cost (all sources) and percent renewable energy cost.		ELEC MEC
			Final Design	Option 1: Indicate, for renewable energy, proposed design total annual energy generated and annual cost.		ELEC MEC
			Final Design	Option 2: Indicate CBECS building type and building gross area. Provide the following CBECS data: median annual electrical intensity, median annual non-electrical fuel intensity, average electric energy cost, average non-electric fuel cost, annual electric energy use and cost, annual non-electric fuel use and cost.		ELEC MEC
			Final Design	Option 2: Narrative describing renewable systems and explaining calculation method used to estimate annual energy generated, including factors influencing performance.		ELEC MEC
EA2.2		On-Site Renewable Energy	Same as EA2.1	Same as EA2.1		ELEC MEC
EA2.3		On-Site Renewable Energy	Same as EA2.1	Same as EA2.1		ELEC MEC
EA3		Enhanced Commissioning	**Final Design	**Owner's Project Requirements document (OPR)		ALL
			**Final Design	**Basis of Design document for commissioned systems (BOD)		ELEC MEC
			**Final Design	**Commissioning Plan		ELEC MEC
			Closeout	Statement confirming all commissioning requirements have been incorporated into construction documents.		PE
			Closeout	**Commissioning Report		PE
			**Final Design	Statement by CxA confirming Commissioning Design Review		
			Closeout	Statement by CxA confirming review of Contractor submittals for compliance with OPR and BOD		PE
			Closeout	**Systems Manual		PE
			Closeout	Statement by CxA confirming completion of O&M staff and occupant training		PE
			Closeout	**Scope of work for post-occupancy review of building operation, including plan for resolution of outstanding issues		PE
			**Predesign	Statement confirming CxA qualifications and contractual relationships relative to work on this project, demonstrating that CxA is an independent third party.		MEC
EA4		Enhanced Refrigerant Management	Final Design	Refrigerant impact calculation table with all building data and calculation values as shown in LEED 2009 Reference Guide Example Calculations		MEC
			Final Design	Narrative describing any special circumstances or explanatory remarks		
			Closeout	X Cut sheets highlighting refrigerant data for all HVAC components.		PE
EA5		Measurement & Verification	Closeout	Statement indicating which compliance path option applies.		PE
			Closeout	Measurement and Verification Plan including Corrective Action Plan		PE
			Closeout	**Scope of work for post-occupancy implementation of M&V plan including corrective action plan.		PE
EA6		Green Power	Closeout	Statement indicating which compliance path option applies.		PE
			Closeout	Option 1: Indicate proposed design total annual electric energy usage		PE
			Closeout	Option 2: Indicate actual total annual electric energy usage		PE
			Closeout	Option 3: Calculation indicating building type, total gross area, median electrical intensity and annual electric energy use		PE

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			Closeout	Green power provider summary table indicating, for each purchase type, provider name, annual quantity green power purchased and contract term. Indicate total annual green power use and indicate percent green power		PE
			Closeout	Narrative describing how Green Power or Green Tags are purchased		PE
<b>CATEGORY 4 – MATERIALS AND RESOURCES</b>						
MRPR1		Storage & Collection of Recyclables (PREREQUISITE)	Final Design	Statement confirming that recycling area will accommodate recycling of plastic, metal, paper, cardboard and glass. Narrative indicating any other materials addressed and coordination with pickup.		ARC
MR1.1		Building Reuse: Maintain 55% of Existing Walls, Floors & Roof	**Final Design	If project includes a building addition, confirm that area of building addition does not exceed 2x the area of the existing building.		ARC
			**Final Design	Spreadsheet listing, for each building structural/envelope element, the existing area and reused area. Total percent reused.		ARC
MR1.2		Building Reuse: Maintain 75% of Existing Walls, Floors & Roof	Same as MR1.1	Same as MR1.1		ARC
MR1.3		Building Reuse: Maintain 95% of Existing Walls, Floors & Roof	Same as MR1.1	Same as MR1.1		ARC
MR1.4		Building Reuse: Maintain 50% of Interior Non-Structural Elements	**Final Design	If project includes a building addition, confirm that area of building addition does not exceed 2x the area of the existing building.		ARC
			**Final Design	Spreadsheet listing, for each building interior non-structural element, the existing area and reused area. Total percent reused.		ARC
MR2.1		Construction Waste Management: Divert 50% From Disposal	**Preconstruction	Waste Management Plan		PE
			**Construction Quarterly and Closeout	Spreadsheet calculations indicating material description, disposal/diversion location (or recycling hauler), weight, total waste generated, total waste diverted, diversion percentage		PE
			**Construction Quarterly and Closeout	Receipts/tickets for all items on spreadsheet		PE
MR2.2		Construction Waste Management: Divert 75% From Disposal	Same as MR2.1	Same as MR2.1		PE
MR3.1		Materials Reuse: 5%	Closeout	Statement indicating total materials value and whether default or actual.		PE
			Closeout	Spreadsheet calculations indicating, for each reused/salvaged material, material description, source or vendor, cost. Total reused/salvaged materials percentage.		PE
MR3.2		Materials Reuse: 10%	Same as MR3.1	Same as MR3.1		PE
MR4.1		Recycled Content: 10% (post-consumer + 1/2 pre-consumer)	Closeout	Statement indicating total materials value and whether default or actual.		PE
			Closeout	Spreadsheet calculations indicating, for each recycled content material, material name/description, manufacturer, cost, post-consumer recycled content percent, pre-consumer recycled content percent, source of recycled content data. Total post-consumer content materials cost, total pre-consumer content materials cost, total combined recycled content materials cost, recycled content materials percentage.		PE
			Final Design or NLT Preconstruction	**Purchasing Plan consisting of spreadsheet indicated above, filled in with estimated quantities to show strategy for achieving goal.		PE
			Closeout	Manufacturer published product data or certification, confirming recycled content percentages in spreadsheet		PE
MR4.2		Recycled Content: 20% (post-consumer + 1/2 pre-consumer)	Same as MR4.1	Same as MR4.1		PE
MR5.1		Regional Materials: 10% Extracted, Processed & Manufactured Regionally	Closeout	Statement indicating total materials value and whether default or actual.		PE
			Closeout	Spreadsheet calculations indicating, for each regional material, material name/description, manufacturer, cost, percent compliant, harvest distance, manufacture distance, source of manufacture and harvest location data. Total regional materials cost, regional materials percentage.		PE
			Preconstruction	**Purchasing Plan consisting of spreadsheet indicated above, filled in with estimated quantities to show strategy for achieving goal.		PE
			Closeout	Manufacturer published product data or certification confirming regional material percentages in spreadsheet		PE

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MR5.2		Regional Materials:20% Extracted, Processed & Manufactured Regionally	Same as MR5.1		Same as MR5.1		PE	
MR6		Rapidly Renewable Materials	Closeout		Statement indicating total materials value and whether default or actual.		PE	
			Closeout		Spreadsheet calculations indicating, for each rapidly renewable material, material name/description, manufacturer, cost, rapidly renewable content percent, rapidly renewable product value. Total rapidly renewable product value, rapidly renewable materials percentage.		PE	
			Final Design		**Purchasing Plan consisting of spreadsheet indicated above, filled in with estimated quantities to show strategy for achieving goal.		ARC	
			Closeout	X	Manufacturer published product data or certification confirming rapidly renewable material percentages in spreadsheet		PE	
MR7		Certified Wood	Closeout		Statement indicating total materials value and whether default or actual.		PE	
			Closeout		Spreadsheet calculations indicating, for each certified wood material, material name/description, vendor, cost, wood component percent, certified wood percent of wood component, FSC chain of custody certificate number. Total certified wood product value, certified wood materials percentage.		PE	
			Final Design or NLT Preconstruction		**Purchasing Plan consisting of spreadsheet indicated above, filled in with estimated quantities to show strategy for achieving goal.		PE	
			Closeout	X	Vendor invoices, FSC chain of custody certificates and anufacturer published product data or certification confirming all certified wood materials percentages in spreadsheet.		PE	
INDOOR ENVIRONMENTAL QUALITY								
EQPR1		Minimum IAQ Performance (PREREQUISITE)	Final Design		Statement indicating which option for compliance applies, stating applicable criteria/requirement, and confirming that project has been designed to meet the applicable requirements.		MEC	
			Final Design		Narrative describing the project's ventilation design, including specifics about fresh air intake volumes and special considerations.		MEC	
EQPR2		Environmental Tobacco Smoke (ETS) Control (PREREQUISITE)	Final Design		Statement indicating which option for compliance applies, stating applicable criteria/requirement, and confirming that project has been designed to meet the applicable requirements.		ARC	
			Final Design		List of drawing and specification references that convey conformance to applicable requirements (signage, exhaust system, room separation details, etc).		ARC	
EQ1		Outdoor Air Delivery Monitoring	Final Design		Statement indicating which option for compliance applies and confirming that project has been designed to meet the applicable requirements.		MEC	
			Final Design		List of drawing and specification references that convey conformance to applicable requirements.		MEC	
			Final Design		Narrative describing the project's ventilation design and CO2 monitoring system, including specifics about monitors, operational parameters and setpoints.		MEC	
			Closeout	X	Cut sheets for CO2 monitoring system.		PE	
EQ2		Increased Ventilation	Final Design		Statement indicating which option for compliance applies and confirming that project has been designed to meet the applicable requirements.		MEC	
			Final Design		Narrative describing the project's ventilation design, including specifics about zone fresh air intake volumes and demonstrating compliance.		MEC	
			Final Design		Option 2: Narrative describing design method used for determining natural ventilation design, including calculation methodology/model results and demonstrating compliance.		MEC	
			Final Design		List of drawing and specification references that convey conformance to applicable requirements.		MEC	
EQ3.1		Construction IAQ Management Plan: During Construction	**Preconstruction		Construction IAQ Management Plan		PE	
			Closeout		Statement confirming whether air handling units were operated during construction		PE	
			Closeout		Dated jobsite photos showing examples of IAQ management plan practices being implemented. Label photos to indicate which practice they demonstrate. Minimum one photo of each practice at each building.		PE	

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PAR		FEATURE	DUE AT	REQUIRED DOCUMENTATION	DATE	REV
			Closeout	Spreadsheet indicating, for each filter installed during construction, the manufacturer, model number, MERV rating, location installed, and if it was replaced immediately prior to occupancy.		PE
EQ3.2		Construction IAQ Management Plan: Before Occupancy	**Preconstruction	Construction IAQ Management Plan		PE
			Closeout	Statement indicating which option for compliance applies and confirming that required activities have occurred that meet the applicable requirements.		PE
			Closeout	Option 1a: Narrative describing the project's flushout process, including specifics about temperature, airflow and duration, special considerations (if any) and demonstrating compliance.		PE
			Closeout	Option 1b: Narrative describing the project's pre-occupancy and post-occupancy flushout processes, including specifics about temperature, airflow and duration, special considerations (if any) and demonstrating compliance.		PE
			Closeout	Option 2: Narrative describing the project's IAQ testing process, including specifics about contaminants tested for, locations, remaining work at time of test, retest parameters and special considerations (if any).		PE
			Closeout	Option 2: IAQ testing report demonstrating compliance.		PE
EQ4.1		Low Emitting Materials: Adhesives & Sealants	Closeout	Spreadsheet indicating, for each applicable indoor adhesive, sealant and sealant primer used, the manufacturer, product name/model number, VOC content, LEED VOC limit, and source of VOC data.		PE
			Closeout	Spreadsheet indicating, for each applicable indoor aerosol adhesive, the manufacturer, product name/model number, VOC content, LEED VOC limit, and source of VOC data - OR - Statement confirming no indoor aerosol adhesives were used for the project.		PE
			Closeout	Manufacturer published product data or certification confirming material VOCs in spreadsheet		PE
EQ4.2		Low Emitting Materials: Paints & Coatings	Closeout	Spreadsheet indicating, for each applicable indoor paint and coating used, the manufacturer, product name/model number, VOC content, LEED VOC limit, and source of VOC data.		PE
			Closeout	Spreadsheet indicating, for each applicable indoor anti-corrosive/anti-rust paint and coating used, the manufacturer, product name/model number, VOC content, LEED VOC limit, and source of VOC data - OR - Statement confirming no indoor anti-corrosive/anti-rust paints were used for the project.		PE
			Closeout	Manufacturer published product data or certification confirming material VOCs in spreadsheet		PE
EQ4.3		Low Emitting Materials: Flooring Systems	Closeout	Spreadsheet indicating, for each indoor flooring system used, the manufacturer, product name/model number, if it meets LEED requirement (yes/no) and source of LEED compliance data.		PE
			Closeout	Spreadsheet indicating, for each indoor carpet cushion used, the manufacturer, product name/model number, if it meets LEED requirement (yes/no) and source of LEED compliance data - OR - Statement confirming no indoor carpet cushion was used for the project.		PE
			Closeout	Manufacturer published product data or certification confirming material compliance label in spreadsheet		PE
EQ4.4		Low Emitting Materials: Composite Wood & Agrifiber Products	Closeout	Spreadsheet indicating, for each indoor composite wood and agrifiber product used, the manufacturer, product name/model number, if it contains added urea formaldehyde (yes/no) and source of LEED compliance data.		PE
			Closeout	Manufacturer published product data or certification confirming material urea formaldehyde in spreadsheet		PE
EQ5		Indoor Chemical & Pollutant Source Control	Closeout	Spreadsheet indicating, for each permanent entryway system used, the manufacturer, product name/model number and description of system.		PE
			Final Design	List of drawing and specification references that convey locations and installation methods for entryway systems.		ARC
			Final Design	Spreadsheet indicating, for each chemical use area, the room number, room name, description of room separation features (walls, floor/ceilings, openings) and pressure differential from surrounding spaces with doors closed - OR - Statement confirming that project includes no chemical use areas and that no hazardous cleaning materials are needed for building maintenance.		ARC MEC
			Final Design	If project includes chemical use areas: List of drawing and specification references that convey locations of chemical use areas, room separation features and exhaust system.		ARC

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PAR		FEATURE	DUE AT	REQUIRED DOCUMENTATION	DATE	REV
			Final Design	If project includes places where water and chemical concentrate mixing occurs: List of drawing and specification references that convey provisions for containment of hazardous liquid wastes OR - Statement confirming that project includes no places where water and chemical concentrate mixing occurs.		ARC MEC
			Closeout	If project includes chemical use areas: Spreadsheet indicating, for AHUs/mechanical ventilation equipment serving occupied areas, the manufacturer, model number, MERV rating, location installed, and if it was replaced immediately prior to occupancy (yes/no) - OR - Statement confirming that project does not use mechanical equipment for ventilation of occupied areas.		PE
EQ6.1		Controllability of Systems: Lighting	Final Design	Calculation indicating total number of individual workstations, number of workstations with individual lighting controls and the percentage of workstations with individual lighting controls.		ELEC
			Final Design	For each shared multi-occupant space, provide a brief description of lighting controls.		ELEC
			Final Design	Narrative describing lighting control strategy, including type and location of individual controls and type and location of controls in shared multi-occupant spaces.		ELEC
EQ6.2		Controllability of Systems: Thermal Comfort	Final Design	Calculation indicating total number of individual workstations, number of workstations with individual thermal comfort controls and the percentage of workstations with individual thermal comfort controls.		MEC
			Final Design	For each shared multi-occupant space, provide a brief description of thermal comfort controls.		MEC
			Final Design	Narrative describing thermal comfort control strategy, including type and location of individual and shared multi-occupant controls.		MEC
EQ7.1		Thermal Comfort: Design	Final Design	Design criteria spreadsheet indicating, for spring, summer, fall and winter, maximum indoor space design temperature, minimum indoor space design temperature and maximum indoor space design humidity.		MEC
			Final Design	Narrative describing method used to establish thermal comfort control conditions and how systems design addresses the design criteria, including compliance with the referenced standard.		MEC
EQ7.2		Thermal Comfort: Verification	Final Design	Narrative describing the scope of work for the thermal comfort survey, including corrective action plan development		MEC
			Final Design	List of drawing and specification references that convey permanent monitoring system.		MEC
EQ8.1		Daylight & Views: Daylight 75% of Spaces	Final Design	Option 2: Table indicating all regularly occupied spaces with space area and space area with compliant daylight zone. Sum of regularly occupied areas and regularly occupied areas with compliant daylight zone. Percentage calculation of areas with compliant daylight zone to total regularly occupied areas.		ARC
			Final Design	Option 1: Simulation model method, software and output data		ELEC
			Final Design	Option 1: Table indicating all regularly occupied spaces with space area, space area with minimum 25 footcandles daylighting illumination, and method of providing glare control. Sum of regularly occupied areas and regularly occupied areas with 25 fc daylighting. Percentage calculation of areas with 25 fc daylighting to total regularly occupied areas.		ELEC
			Final Design	For all occupied spaces excluded from the calculation, provide narrative indicating reasons for excluding the space.		ARC
			Final Design	List of drawing and specification references that convey exterior glazed opening head and sill heights, glazing performance properties and glare control/sunlight redirection devices.		ARC
			Closeout	Manufacturer published product data or certification confirming glazing Tvis in spreadsheet		PE
EQ8.2		Daylight & Views: Views for 90% of Spaces	Final Design	Table indicating all regularly occupied spaces with space area and space area with access to views. Sum of regularly occupied areas and regularly occupied areas with access to views. Percentage calculation of areas with views to total regularly occupied areas.		ARC
			Final Design	For all occupied spaces excluded from the calculation, provide narrative indicating reasons for excluding the space.		ARC
			Final Design	LEED Floor plan drawings showing line of sight diagramming of views areas in each regularly occupied space. List of drawing/specification references that convey exterior glazed opening head and sill heights.		ARC

**INNOVATION & DESIGN PROCESS**

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PAR		FEATURE	DUE AT		REQUIRED DOCUMENTATION	DATE	REV
IDc1.1		Innovation in Design	Final Design		Narrative describing intent, requirement for credit, project approach to the credit. List of drawings and specification references that convey implementation of credit. All other documentation that validates claimed credit.		
IDc1.2		Innovation in Design	Final Design				
IDc1.3		Innovation in Design	Final Design				
IDc1.4		Innovation in Design	Final Design				
IDc2		LEED Accredited Professional	Final Design		Narrative indicating name of LEED AP, company name of LEED AP, description of LEED AP's role and responsibilities in the project.		ARC

**ATTACHMENT F**  
Version 02-03-2010

**BUILDING INFORMATION MODELING REQUIREMENTS**

**1.0 Section 1 - Submittal Format**

1.1. Design Deliverables. Develop all designs using Building Information Modeling (BIM) and Computer Aided Design (CAD) software. Design submittal drawings shall be half-size size, suitable for half-size scaled reproduction.

**2.0 Section 2 – Design Requirements**

2.1. BIM Model and Facility Data. Contractor shall use BIM application(s) and software(s) to develop project designs. "Facility Data" is defined as associated intelligent attribute data. The "Model" is defined as 3D graphics that includes Facility Data and output as described in the paragraph 'Output' below. Contractors will use the Model to produce accurate Construction Documents. For each Center of Standardization (CoS) facility type included in this project, all BIM Models and associated Facility Data shall be submitted in Bentley Systems BIM [Not Supplied - SubmittalReqCADDSystem : BENTLEY\_VERSION] with associated USACE Bentley BIM Workspace (which includes specific standard BIM libraries and definitions). This Workspace can be downloaded from the CAD/BIM Technology Center. [Where available, the workspace will be specific to this CoS Facility Standard Design. The Contractor will be provided a baseline multi-discipline BIM Project Model for the CoS Facility Standard Design type, where such a model exists (for the purposes of site adaptation).] The USACE Bentley BIM Workspace is dependent on specific versions of the Bentley BIM suite of products and only the versions of the software that are listed in the Contractor instructions included with the USACE BIM Workspace are permitted to be used.

2.1.1. Reference. Refer to ERDC TR-06-10, "U.S. Army Corps of Engineers Building Information Modeling Road Map" from the CAD/BIM Technology Center website for more information on the USACE BIM implementation goals.

2.2. Drawings. Deliver CAD files used for the creation of the Construction Documents Drawings per requirements in Section 01 33 16, the criteria of the USACE Fort Worth District, and as noted herein. Specification of a CAD file format for these Drawings does not limit which BIM application(s) or software(s) may be used for project development and execution.

2.2.1. IFC Support. The Contractor's selected BIM application(s) and software(s) must support the IFC (Industry Foundation Class - see [www.iai-tech.org](http://www.iai-tech.org)). Submit any deviations from or additions to the IFC property sets for any new spaces, systems, and equipment for Government approval.

2.2.2. Submittal Requirements. BIM submittals shall be fully interoperable, compatible, and editable with the Bentley BIM tools. Use the specified version of the USACE Bentley BIM Workspace and conform to the requirements of **Sections 3 and 4 below**.

2.2.3. BIM Project Execution Plan.

2.2.3.1. Develop a BIM Project Execution Plan ("Plan" or "PxP") documenting the BIM and analysis technologies selected for the Project Model (integrated with the AEC CAD Standard) from concept development through As-Builts as a design, production, coordination, construction, and documentation tool and the collaborative process by which it shall be executed. See Section 7 for additional guidance on developing the Plan.

2.2.4. BIM Requirements..

2.2.4.1. Facility Data. Develop the Facility Data consisting of a set of intelligent elements for the Model (e.g., doors, air handlers, electrical panels). This Facility Data shall include all material definitions and attributes that are necessary for the Project facility design and construction. Additional data in support of Section 6 Contractor Electives is encouraged.

2.2.4.2. Model Content. The Model and Facility Data shall include, at a minimum, the requirements of Section 4 below.

2.2.4.3. Model Granularity. Models may vary in level of detail for individual elements within a model, but at a minimum must include all features that would be included on a quarter inch (1/4" = 1'0") scaled drawing (e.g. at least 1/16<sup>th</sup>, 1/8<sup>th</sup> and 1/4<sup>th</sup>), or appropriately scaled civil drawings.

2.2.4.4. Output. Submitted CAD drawings (e.g., plans, elevations, sections, schedules, details, etc.) shall be derived (commonly known as extractions, views or sheets) and maintained from the submitted Model and Facility Data.

2.3. Quality Control. Implement quality control (QC) parameters for the Model, including:

2.3.1. Model Standards Checks. QC validation used to ensure that the Project Facility Data set has no undefined, incorrectly defined or duplicated elements. Report non-compliant elements and corrective action plan to correct non-compliant elements. Provide the government with detailed justification and request government approval for any non-compliant element which the contractor proposes to be allowed to remain in the Model.

2.3.2. CAD Standards Checks. QC checking performed to ensure that the fonts, dimensions, line styles, levels and other construction document formatting issues are followed per the A/E/C CADD Standard.

2.3.3. Other Parameters. Develop such other QC parameters as Contractor deems appropriate for the Project and provide to the Government for concurrence.

2.4. Design and Construction Reviews. Perform design and construction reviews at each submittal stage under Section 3 to test the Model, including:

2.4.1. Visual Checks. Checking to ensure the design intent has been followed and that there are no unintended elements in the Model.

2.4.2. Interference Management Checks. Locate conflicting spatial data in the Model where two elements are occupying the same space. Log hard interferences (e.g., mechanical vs. structural or mechanical vs. mechanical overlaps in the same location) and soft interferences, (e.g., conflicts regarding equipment clearance, service access, fireproofing, insulation) in a written report and resolve.

2.4.3. IFC Coordination View. Provide an IFC Coordination View in IFC Express format for all deliverables. Provide exported property set data for all IFC supported named building elements.

2.4.4. Other Parameters. Develop such other Review parameters as the Contractor deems appropriate for the Project and provide to the Government for concurrence..

### **3.0 Section 3 – Design Stage Submittal Requirements**

3.1. General Submittal Requirements.

3.1.1. Provide submittals in compliance with BIM Project Execution Plan deliverables at stages as described hereinafter.

3.1.2. At each Stage in Paragraphs 3.3 through 3.6, provide a Contractor-certified written report confirming that consistency checks as identified in Paragraphs 2.3 and 2.4 have been completed. This report shall be discussed as part of the review process and shall address cross-discipline interferences, if any.

3.1.3. At each Stage in Paragraphs 3.3 through 3.6, provide the Government with:

- The Model, Facility Data, Workspace and CAD Data files in native Bentley BIM/CAD.

- A 3-D interactive review format of the Model in Bentley Navigator, Autodesk Navisworks, Adobe 3D PDF 7.0 (or later), Google Earth KMZ or other format per Plan requirements. The file format for reviews can change between submittals.

- A list of all submitted files. The list should include a description, directory, and file name for each file submitted. For all CAD sheets, include the sheet title and sheet number. Identify files that have been produced from the submitted Model and Facility Data.

### 3.2. Initial Design Conference Submittal.

3.2.1. Submit a digital copy of the Plan where, in addition to Paragraph 3.1.4, the USACE Geographic District BIM Manager will coordinate with the USACE CoS BIM Manager to confirm acceptability of the Plan or advise as to additional processes or activities necessary to be incorporated.

3.2.2. Within thirty (30) days after the approval of the Plan, conduct a demonstration to review the Plan for clarification, and to verify the functionality of Model technology workflow and processes. If modifications are required, the Contractor shall complete the modifications and resubmit the Plan and perform subsequent demonstration for Government acceptance. There will be no payment for design or construction until the Plan is acceptable to the Government. The Government may also withhold payment for design and construction for unacceptable performance in executing the approved Plan.

### 3.3. Interim Design Submittals.

3.3.1. BIM and CAD Data. The Model shall include the requirements identified in Paragraph 2.2.4 as applicable to the Interim Design package(s).

### 3.4. Final Design Submissions and Design Complete Submittals.

3.4.1. BIM and CAD Data. The Model shall include the requirements identified in Paragraph 2.2.4. Acceptance according to Paragraph 3.1.4 is required before commencement of construction, as described in Paragraph 3.7.6 of Section 01 33 16.

3.5. Construction Submittals – Over-The-Shoulder Progress Reviews. Periodic quality control meetings or construction progress review meetings shall include quality control reviews on the implementation and use of the Model, including interference management and design change tracking information.

3.6. Final As-Built BIM and CAD Data Submittal. Submit the final Model, Facility Data, and CAD files reflecting as-built conditions for Government Approval, as specified in Section 01 78 02.00 10, PROJECT CLOSEOUT.

## 4.0 **Section 4 – BIM Model Minimum Requirements and Output**

4.1. General Provisions. The deliverable Model shall be developed to include the systems described below as they would be built and the processes of installing them, and to reflect final as-built conditions. The deliverable model at the interim design stage and at the final design stage (“released for construction”) shall be developed to include as many of the systems described below as are necessary and appropriate at that design stage.

4.2. Architectural/Interior Design. The Architectural systems Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a quarter inch (1/4”=1’0”) scaled drawing. Additional minimum Model requirements include:

4.2.1. Spaces. The Model shall include spaces defining accurate net square footage and net volume, and holding data for the room finish schedule for including room names and numbers. Include Programmatic Information provided by the Government or validated program to verify design space against programmed space, using this information to validate area quantities.

4.2.2. Walls and Curtain Walls. Each wall shall be depicted to the exact height, length, width and ratings (thermal, acoustic, fire) to properly reflect wall types. The Model shall include all walls, both interior and exterior, and the necessary intelligence to produce accurate plans, sections and elevations depicting these design elements.

4.2.3. Doors, Windows and Louvers. Doors, windows and louvers shall be depicted to represent their actual size, type and location. Doors and windows shall be modeled with the necessary intelligence to produce accurate window and door schedules.

4.2.4. Roof. The Model shall include the roof configuration, drainage system, penetrations, specialties, and the necessary intelligence to produce accurate plans, building sections and generic wall sections where roof design elements are depicted.

4.2.5. Floors. The floor slab shall be developed in the structural Model and then referenced by the architectural Model for each floor of the Project building.

4.2.6. Ceilings. All heights and other dimensions of ceilings, including soffits, ceiling materials, or other special conditions shall be depicted in the Model with the necessary intelligence to produce accurate plans, building sections and generic wall sections where ceiling design elements are depicted.

4.2.7. Vertical Circulation. All continuous vertical components (i.e., non-structural shafts, architectural stairs, handrails and guardrails) shall be accurately depicted and shall include the necessary intelligence to produce accurate plans, elevations and sections in which such design elements are referenced.

4.2.8. Architectural Specialties and Woodwork. All architectural specialties (i.e., toilet room accessories, toilet partitions, grab bars, lockers, and display cases) and woodwork (i.e., cabinetry and counters) shall be accurately depicted with the necessary intelligence to produce accurate plans, elevations and sections in which such design elements are referenced.

4.2.9. Signage. The Model shall include all signage and the necessary intelligence to produce accurate plans and schedules.

4.2.10. Schedules. Provide door, window, hardware sets using BHMA designations, flooring, wall finish, and signage schedules from the Model, indicating the type, materials and finishes used in the design.

4.3. Furniture. The furniture systems Model may vary in level of detail for individual elements within a Model, but at a minimum must include all features that would be included on a quarter inch (1/4"=1'0") scaled drawing, and have necessary intelligence to produce accurate plans. Representation of furniture elements is to be 2D. Contractor may provide a minimal number of 3D representations as examples. Examples of furniture include, but are not limited to, desks, furniture systems, seating, tables, and office storage.

4.3.1. Furniture Coordination. Furniture that makes use of electrical, data or other features shall include the necessary intelligence to produce coordinated documents and data.

4.4. Equipment. The Model may vary in level of detail for individual elements within a Model. Equipment shall be depicted to meet layout requirements with the necessary intelligence to produce accurate plans and minimum schedules depicting their configuration. Examples of equipment include but are not limited to copiers, printers, refrigerators, ice machines and microwaves.

4.4.1. Schedules. Provide furniture and equipment schedules from the model indicating the materials, finishes, mechanical, and electrical requirements.

4.5. Structural. The structural systems Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a quarter inch (1/4"=1'0") scaled drawing. Additional minimum Model requirements include:

4.5.1. Foundations. All necessary foundation and/or footing elements, with necessary intelligence to produce accurate plans and elevations

4.5.2. Floor Slabs. Structural floor slabs shall be depicted, including all necessary recesses, curbs, pads, closure pours, and major penetrations accurately depicted.

4.5.3. Structural Steel. All steel columns, primary and secondary framing members, and steel bracing for the roof and floor systems (including decks), including all necessary intelligence to produce accurate structural steel framing plans and related building/wall sections.

4.5.4. Cast-in-Place Concrete. All walls, columns, and beams, including necessary intelligence to produce accurate plans and building/wall sections depicting cast-in-place concrete elements.

4.5.5. Expansion/Contraction Joints. Joints shall be accurately depicted.

4.5.6. Stairs. The structural Model shall include all necessary openings and framing members for stair systems, including necessary intelligence to produce accurate plans and building/wall sections depicting stair design elements.

4.5.7. Shafts and Pits. The structural Model shall include all necessary shafts, pits, and openings, including necessary intelligence to produce accurate plans and building/wall sections depicting these design elements.

4.6. Mechanical. The mechanical systems Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a quarter inch (1/4"=1'0") scaled drawing. Small diameter (less than 1-1/2" NPS) field-routed piping is not required in the model. Additional minimum Model requirements include:

4.6.1. HVAC. All necessary heating, ventilating, air-conditioning and specialty equipment, including air distribution ducts for supply, return, and ventilation and exhaust ducts, including control system, registers, diffusers, grills and hydronic baseboards with necessary intelligence to produce accurate plans, elevations, building/wall sections and schedules.

4.6.1.1. Mechanical Piping. All necessary piping and fixture layouts, and related equipment, including necessary intelligence to produce accurate plans, elevations, building/wall sections, and schedules.

4.6.2. Plumbing. All necessary plumbing piping and fixture layouts, floor and area drains, and related equipment, including necessary intelligence to produce accurate plans, elevations, building/wall sections, riser diagrams, and schedules.

4.6.3. Equipment Clearances. All HVAC and Plumbing equipment clearances shall be modeled for use in interference management and maintenance access requirements.

4.6.4. Elevator Equipment. The Model shall include the necessary equipment and control system, including necessary intelligence to produce accurate plans, sections and elevations depicting these design elements.

4.7. Electrical/Telecommunications. The electrical systems Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a quarter inch (1/4"=1'0") scaled drawing. Small diameter (less than 1-1/2"Ø) field-routed conduit is not required in the model. Additional minimum Model requirements include:

4.7.1. Interior Electrical Power and Lighting. All necessary interior electrical components (i.e., lighting, receptacles, special and general purpose power receptacles, lighting fixtures, panelboards, cable trays and control systems), including necessary intelligence to produce accurate plans, details and schedules. Lighting and power built into furniture/equipment shall be modeled.

4.7.2. Special Electrical Systems. All necessary special electrical components (i.e., security, Mass Notification, Public Address, nurse call and other special occupancies, and control systems), including necessary intelligence to produce accurate plans, details and schedules.

4.7.3. Grounding Systems. Grounding Systems. All necessary grounding components (i.e., lightning protection systems, static grounding systems, communications grounding systems, bonding), including necessary intelligence to produce accurate plans, details and schedules.

4.7.4. Communications. All existing and new communications service controls and connections, both above ground and underground with necessary intelligence to produce accurate plans, details and schedules. Cable tray routing shall be modeled without detail of cable contents.

4.7.5. Exterior Building Lighting. All necessary exterior lighting with necessary intelligence to produce accurate plans, elevations and schedules. The exterior building lighting Model shall include all necessary lighting, relevant existing and proposed support utility lines and equipment required with necessary intelligence to produce accurate plans, details and schedules.

4.7.6. Equipment Clearances. The model shall incorporate and define all electrical and communications working spaces, clearances, and required access

4.8. Fire Protection. The fire protection system Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a quarter inch (1/4"=1'0") scaled drawing. Additional minimum Model requirements include:

4.8.1. Fire Protection System. All relevant fire protection components (i.e., branch piping, sprinkler heads, fittings, drains, pumps, tanks, sensors, control panels) with necessary intelligence to produce accurate plans, elevations, building/wall sections, riser diagrams, and schedules. All fire protection piping shall be modeled.

4.8.2. Fire Alarms. Fire alarm/mass notification devices and detection system shall be indicated with necessary intelligence to produce accurate plans depicting them.

4.9. Civil. The civil Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a one inch (1"=100') scaled drawing. Additional minimum Model requirements include:

4.9.1. Terrain (DTM). All relevant site conditions and proposed grading, including necessary intelligence to produce accurate Project site topographical plans and cross sections.

4.9.2. Drainage. All existing and new drainage piping, including upgrades thereto, including necessary intelligence to produce accurate plans and profiles for the Project site.

4.9.3. Storm Water and Sanitary Sewers. All existing and new sewer structures and piping, including upgrades thereto, on the Project site with necessary connections to mains or other distribution points as appropriate, including necessary intelligence to produce accurate plans and profiles for the Project site.

4.9.4. Utilities. All necessary new utilities connections from the Project building(s) to the existing or newly-created utilities, and all existing above ground and underground utility conduits, including necessary intelligence to produce accurate plans and site-sections.

4.9.5. Roads and Parking. All necessary roadways and parking lots or parking structures, including necessary intelligence to produce accurate plans, profiles and cross-sections.

## **5.0 Section 5 - Ownership and Rights in Data**

5.1. Ownership. The Government has ownership of and rights at the date of Closeout Submittal to all CAD files, BIM Model, and Facility Data developed for the Project in accordance with FAR Part 27, clauses incorporated in Section 00 72 00, Contract Clauses and Special Contract Requirement 1.14 GOVERNMENT RE-USE OF DESIGN (Section 00 73 00). The Government may make use of this data following any deliverable.

## **6.0 Section 6 – Contractor Electives**

6.1. Applicable Criteria. If the Contractor elected to include one or more of the following features as an elective in its accepted contract proposal for additional credit during the source selection, as described in the proposal submission requirements and evaluation criteria, the following criteria are requirements, as applicable to those elective feature(s).

6.2. COBIE Compliance. The Model and Facility Data for the Project shall fulfill Construction Operations Building Information Exchange (COBIE) requirements as defined by the Whole Building Design Guide organization, including all requirements for the indexing and submission of Portable Document Format (PDF) and other appropriate file formats that would otherwise be printed and submitted in compliance with Project operations and maintenance handover requirements.

6.3. Project Scheduling using the Model. In the BIM Execution Plan and during the Preliminary BIM Execution Plan Review, provide an overview of the use of BIM in the development and support of the project construction schedule.

6.3.1. Submittal Requirements. During the Submittal stages, the Contractor shall deliver the construction schedule with information derived from the Model.

6.3.1.1. Construction Submittals – Over-The-Shoulder Progress Reviews. Periodic quality control meetings or construction progress review meetings shall include quality control reviews on the implementation and use of the Model for project scheduling.

6.4. Cost Estimating. In the BIM Execution Plan and during the Preliminary BIM Execution Plan Review, provide an overview of the use of BIM in the development and support of cost estimating requirements, or other applications such as cost analysis and estimate validation.

6.4.1. Submittal Requirements. During the Submittal stages, the Contractor shall deliver cost estimating information derived from the Model.

6.4.2. Project completion. At project completion, the Contractor shall provide an MII (Micro Computer Aided Cost Estimating System Generation II) Cost Estimate which follows the USACE Cost Engineering Military Work Breakdown System (WBS), a modified Uniformat, to at least the sub-systems level and uses quantity information supplied directly from BIM output to the maximum extent possible, though other "Gap" quantity information will be included as necessary for a complete and accurate cost estimate.

6.4.2.1. Sub system level extracted quantities from the BIM for use within the estimate shall be provided according to how detailed line items or tasks should be installed/built so that accurate costs can be developed and/or reflected. Therefore, when developing a BIM, the designer shall be cognizant of what tasks need to be separated appropriately at the beginning stages of model development, such as tasks done on the first floor versus the same task on higher floors that will be more labor intensive and therefore need to have a separate quantity and be priced differently. Tasks and their extracted quantities from the BIM shall be broken down by their location (proximity in the structure) as well as the complexity of its installation.

6.4.2.2. At all design stages it shall be understood that BIM output as described in this document will not generate all quantities that are necessary in order to develop a complete and accurate cost estimate of the project based on the design. An example of this would be plumbing that is less than 1.5" diameter and therefore not expected to be modeled due to granularity; this information is commonly referred to as The Gap. Quantities from The Gap and their associated costs shall be included in the final project actual cost estimates as well.

6.5. Other Analyses and Reports. Structural, energy and efficiency, EPACT 2005 & EISA 2007, lighting design, daylighting, electrical power, psychrometric processing, shading, programming, LEED, fire protection, code compliance, Life Cycle Cost, acoustic, plumbing.

## **7.0 Section 7 – BIM Project Execution Plan Template**

7.1. Contractors will utilize the latest version of the USACE BIM PROJECT EXECUTION PLAN (USACE PxP) Template to develop an acceptable Plan. The template can be downloaded from the CAD/BIM Technology Center website.







**ATTACHMENT G****DESIGN SUBMITTAL DIRECTORY AND SUBDIRECTORY FILE ARRANGEMENT**

Organize electronic design submittal files in a subdirectory/file structure in accordance with the following table. The Contractor may suggest a slightly different structure, subject to the discretion of the government.

**Design Submittal Directory and Subdirectory File Arrangement.**

Directory	Sub-Directory	Sub-Directory or Files	Files
Submittal/Package Name	Narratives	PDF file or files with updated design narrative for each applicable design discipline	
	Drawings	PDF (subdirectory)	Single PDF file with all applicable drawing sheets - bookmarked by sheet number and name
		BIM (subdirectory) See Attachment F.	BIM project folder (with files) per the USACE Workspace. Include an Excel drawing index file with each drawing sheet listed by sheet #, name and corresponding dgn file name (Final Design & Design Complete only)
	Design Analysis & Calculations	Individual PDF files containing design analysis and calculations for each discipline applicable to the submittal	
		PDF file with Fire Protection and Life Safety Code Review checklist	
	LEED	PDF file with updated Leed Check List	
		PDF file or files with LEED Templates for each point with applicable documentation included in each file.	
		LEED SUBMITTALS	
	Energy Analysis	PDF with baseline energy consumption analysis	
		PDF with actual building energy consumption analysis	
	Specifications	Single PDF file with table of contents and all applicable specifications sections.	
		Submittal Register (Final Design & Design Complete submittal only)	
	Design Quality Control	PDF file or files with DQC checklist(s) and/or statements	
	Building Rendering(s)	PDF file of rendering for each building type included in contract (Final Design & Design Complete).	

**SECTION 01 45 04.00 10**  
**CONTRACTOR QUALITY CONTROL**

**1.0 GENERAL**

1.1. REFERENCES

1.2. PAYMENT

**2.0 PRODUCTS (NOT APPLICABLE)**

**3.0 EXECUTION**

3.1. GENERAL REQUIREMENTS

3.2. QUALITY CONTROL PLAN

3.3. COORDINATION MEETING

3.4. QUALITY CONTROL ORGANIZATION

3.5. SUBMITTALS AND DELIVERABLES

3.6. CONTROL

3.7. TESTS

3.8. COMPLETION INSPECTION

3.9. DOCUMENTATION

3.10. NOTIFICATION OF NONCOMPLIANCE

## **1.0 GENERAL**

### **1.1. REFERENCES**

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. Refer to the latest edition, as of the date of the contract solicitation.

- ASTM INTERNATIONAL (ASTM)
- ASTM D 3740 Minimum Requirements for Agencies  
Engaged in the Testing and/or Inspection  
of Soil and Rock as Used in Engineering  
Design and Construction
- ASTM E 329 Agencies Engaged in the Testing  
and/or Inspection of Materials Used in  
Construction
- U.S. ARMY CORPS OF ENGINEERS (USACE)  
ER 1110-1-12 Quality Management

### **1.2. PAYMENT**

There will be no separate payment for providing and maintaining an effective Quality Control program. Include all costs associated therewith in the applicable unit prices or lump-sum prices contained in the Contract Line Item Schedule.

## **2.0 PRODUCTS (Not Applicable)**

## **3.0 EXECUTION**

### **3.1. GENERAL REQUIREMENTS**

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Contract Clause titled "Inspection of Construction." The quality control system shall consist of plans, procedures, and organization necessary to produce an end product, which complies with the contract requirements. The system shall cover all design and construction operations, both onsite and offsite, and shall be keyed to the proposed design and construction sequence. The site project superintendent is responsible for the quality of work on the job and is subject to removal by the Contracting Officer for non-compliance with the quality requirements specified in the contract. The site project superintendent in this context shall be the highest level manager responsible for the overall construction activities at the site, including quality and production. The site project superintendent shall maintain a physical presence at the site at all times, except as otherwise acceptable to the Contracting Officer, and shall be responsible for all construction and construction related activities at the site.

### **3.2. QUALITY CONTROL PLAN**

Furnish for Government review, not later than 30 days after receipt of notice to proceed, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract Clause titled "Inspection of Construction." The plan shall identify personnel, procedures, control, instructions, tests, records, and forms to be used. The Government will consider an interim plan for the first 30 days of operation. Design and construction may begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started. The Government will not permit work outside of the features of work included in an accepted interim plan to begin until acceptance of a CQC Plan or another interim plan containing the additional features of work to be started. Where the applicable Code issued by the International Code Council calls for an inspection by the Building Official, the Contractor shall include the inspections in the Quality Control Plan and shall perform the inspections. The Designer of Record shall develop a program for any special inspections required by the applicable International Codes and the Contractor shall perform these inspections, using qualified inspectors. Include the special inspection plan in the QC Plan.

### 3.2.1. Content of the CQC Plan

The CQC Plan shall include, as a minimum, the following to cover all design and construction operations, both onsite and offsite, including work by subcontractors, fabricators, suppliers, and purchasing agents subcontractors, designers of record, consultants, architect/engineers (AE), fabricators, suppliers, and purchasing agents:

3.2.1.1. A description of the quality control organization. Include a chart showing lines of authority and an acknowledgment that the CQC staff shall implement the three phase control system for all aspects of the work specified. A CQC System Manager shall report to the project superintendent or someone higher in the contractor's organization.

3.2.1.2. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function. Also include those responsible for performing and documenting the inspections required by the International Codes and the special inspection program developed by the designer of record.

3.2.1.3. A copy of the letter to the CQC System Manager, signed by an authorized official of the firm, which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop work which is not in compliance with the contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities. Furnish copies of these letters.

3.2.1.4. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers, and purchasing agents subcontractors, designers of record, consultants, architect engineers (AE), offsite fabricators, suppliers, and purchasing agents. These procedures shall be in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.

3.2.1.5. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. Use only Government approved Laboratory facilities.

3.2.1.6. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.

3.2.1.7. Procedures for tracking design and construction deficiencies from identification through acceptable corrective action. These procedures shall establish verification that identified deficiencies have been corrected.

3.2.1.8. Reporting procedures, including proposed reporting formats.

3.2.1.9. A list of the definable features of work. A definable feature of work is a task, which is separate and distinct from other tasks, has separate control requirements, and may be identified by different trades or disciplines, or it may be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there are frequently more than one definable feature under a particular section. This list will be agreed upon during the coordination meeting.

3.2.1.10. A list of all inspections required by the International Codes and the special inspection program required by the code and this contract.

### 3.2.2. Additional Requirements for Design Quality Control (DQC) Plan

The following additional requirements apply to the Design Quality Control (DQC) plan:

3.2.2.1. The Contractor's QCP Plan shall provide and maintain a Design Quality Control (DQC) Plan as an effective quality control program which will assure that all services required by this design-build contract are performed and provided in a manner that meets professional architectural and engineering quality standards. As a minimum, competent, independent reviewers identified in the DQC Plan shall review all documents. Use personnel who were not involved in the design effort to produce the design to perform the independent technical review (ITR). The ITR is intended as a quality control check of the design. Include, at least, but not necessarily limited to, a review of the contract requirements (the accepted contract or task order proposal and amended RFP), the basis of design, design calculations, the design configuration management documentation and check the design documents for

errors, omissions, and for coordination and design integration. The ITR team is not required to examine, compare or comment concerning alternate design solutions but should concentrate on ensuring that the design meets the contract requirements. Correct errors and deficiencies in the design documents prior to submitting them to the Government.

3.2.2.2. Include in the DQC Plan the discipline-specific checklists to be used during the design and quality control of each submittal. Submit these completed checklists at each design phase as part of the project documentation.

3.2.2.3. A Design Quality Control Manager, who has the responsibility of being cognizant of and assuring that all documents on the project have been coordinated, shall implement the DQC Plan. This individual shall be a person who has verifiable engineering or architectural design experience and is a registered professional engineer or architect. Notify the Government, in writing, of the name of the individual, and the name of an alternate person assigned to the position.

### 3.2.3. Acceptance of Plan

Government acceptance of the Contractor's plan is required prior to the start of design and construction. Acceptance is conditional and will be predicated on satisfactory performance during the design and construction. The Government reserves the right to require the Contractor to make changes in his CQC Plan and operations including removal of personnel, as necessary, to obtain the quality specified.

### 3.2.4. Notification of Changes

After acceptance of the CQC Plan, notify the Government in writing of any proposed change. Proposed changes are subject to Government acceptance.

## 3.3. COORDINATION MEETING

After the Postaward Conference, before start of design or construction, and prior to acceptance by the Government of the CQC Plan, the Contractor and the Government shall meet and discuss the Contractor's quality control system. Submit the CQC Plan for review a minimum of 7 calendar days prior to the Coordination Meeting. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, design activities, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. The Government will prepare minutes of the meeting for signature by both parties. . The minutes shall become a part of the contract file. There may be occasions when either party will call for subsequent conferences to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which may require corrective action by the Contractor.

## 3.4. QUALITY CONTROL ORGANIZATION

### 3.4.1. Personnel Requirements

The requirements for the CQC organization are a CQC System Manager, a Design Quality Manager, and sufficient number of additional qualified personnel to ensure contract compliance. The CQC organization shall also include personnel identified in the technical provisions as requiring specialized skills to assure the required work is being performed properly. The Contractor's CQC staff shall maintain a presence at the site at all times during progress of the work and have complete authority and responsibility to take any action necessary to ensure contract compliance. The CQC staff shall be subject to acceptance by the Contracting Officer. Provide adequate office space, filing systems and other resources as necessary to maintain an effective and fully functional CQC organization. Promptly furnish complete records of all letters, material submittals, shop drawing submittals, schedules and all other project documentation to the CQC organization. The CQC organization shall be responsible to maintain these documents and records at the site at all times, except as otherwise acceptable to the Contracting Officer.

### 3.4.2. CQC System Manager

Identify as CQC System Manager an individual within the onsite work organization who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System

Manager shall be a graduate engineer, graduate architect, or a BA/BS graduate of an ACCE accredited construction management college program. The CQC system Manager may alternately be an engineering technician with at least 2 years of college and an ICC certification as a Commercial Building Inspector (Residential Building Inspector certification will be required for Military Family Housing projects). In addition, the CQC system manager shall have a minimum of 5 years construction experience on construction similar to this contract. The CQC System Manager shall be on the site at all times during construction and shall be employed by the prime Contractor. Assign the CQC System Manager no other duties (except may also serve as Safety and Health Officer, if qualified and if allowed by Section 00 73 00). Identify an alternate for the CQC System Manager in the plan to serve in the event of the System Manager's absence. The requirements for the alternate shall be the same as for the designated CQC System Manager but the alternate may have other duties in addition to serving in a temporary capacity as the acting QC manager.

### 3.4.3. CQC Personnel

3.4.3.1. In addition to CQC personnel specified elsewhere in the contract provide specialized CQC personnel to assist the CQC System Manager in accordance with paragraph titled Area Qualifications.

3.4.3.2. These individuals may be employees of the prime or subcontractor; be responsible to the CQC System Manager; **are not intended to be full time, but must be physically present at the construction site during work on their areas of responsibility**; have the necessary education and/or experience in accordance with the experience matrix listed herein. These individuals may perform other duties but must be allowed sufficient time to perform their assigned quality control duties as described in the Quality Control Plan. **One person may cover more than one area, provided that they are qualified to perform QC activities for the designated areas below and provided that they have adequate time to perform their duties:**

### 3.4.4. Experience Matrix

#### 3.4.4.1. Area Qualifications

3.4.4.1.1. Civil - Graduate Civil Engineer or (BA/BS) graduate in construction management with 4 years experience in the type of work being performed on this project or engineering technician with 5 yrs related experience.

3.4.4.1.2. Mechanical - Graduate Mechanical Engineer or (BA/BS) graduate in construction management with 4 yrs related experience or engineering technician with an ICC certification as a Commercial Mechanical Inspector with 5 yrs related experience.

3.4.4.1.3. Electrical - Graduate Electrical Engineer or (BA/BS) graduate in construction management with 4 yrs related experience or engineering technician with an ICC certification as a Commercial Electrical Inspector with 5 yrs related experience.

3.4.4.1.4. Structural - Graduate Structural Engineer or (BA/BS) graduate in construction management with 4 yrs related experience or person with an ICC certification as a Reinforced Concrete Special Inspector and Structural Steel and Bolting Special Inspector (as applicable to the type of construction involved) with 5 yrs related experience.

3.4.4.1.5. Plumbing - Graduate Mechanical Engineer or (BA/BS) graduate in construction management with 4 yrs related experience, or person with an ICC certification as a Commercial Plumbing Inspector with 5 yrs related experience.

3.4.4.1.6. Concrete, Pavements and Soils Materials Technician (present while performing tests) with 2 yrs experience for the appropriate area

3.4.4.1.7. Testing, Adjusting and Balancing Specialist must be a member (TAB) Personnel of AABC or an experienced technician of the firm certified by the NEBB (present while testing, adjusting, balancing).

3.4.4.1.8. Design Quality Control Manager Registered Architect or Professional Engineer (not required on the construction site)



3.4.4.1.9. Registered Fire Protection Engineer with 4 years related experience or engineering technician with 5 yrs related experience (but see requirements for Fire Protection Engineer of Record to witness final testing in Section 01 10 00, paragraph 5.10, Fire Protection).

3.4.4.1.10. QC personnel assigned to the installation of the telecommunication system or any of its components shall be Building Industry Consulting Services International (BICSI) Registered Cabling Installers, Technician Level. Submit documentation of current BICSI certification. In lieu of BICSI certification, QC personnel shall have a minimum of 5 years experience in the installation of the specified copper and fiber optic cable and components. They shall have factory or factory approved certification from each equipment manufacturer indicating that they are qualified to install and test the provided products. QC personnel shall witness and certify the testing of telecommunications cabling and equipment.

#### 3.4.5. Additional Requirement

In addition to the above experience and/or education requirements the CQC System Manager shall have completed the course entitled "Construction Quality Management for Contractors". This course is periodically offered at [Not Supplied - ConstructionReqQC : COURSE\_LOCATION]. Inquire of the District or Division sponsoring the course for fees and other expenses involved, if any, for attendance at this course.

#### 3.4.6. Organizational Changes

When it is necessary to make changes to the CQC staff, the Contractor shall revise the CQC Plan to reflect the changes and submit the changes to the Contracting Officer for acceptance.

#### 3.5. SUBMITTALS AND DELIVERABLES

Make submittals as specified in Section 01 33 00 **SUBMITTAL PROCEDURES**. The CQC organization shall certify that all submittals and deliverables are in compliance with the contract requirements.

#### 3.6. CONTROL

Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. The CQC organization shall conduct at least three phases of control for each definable feature of the construction work as follows:

##### 3.6.1. Preparatory Phase

Perform this phase prior to beginning work on each definable feature of work, after all required plans/documents/materials are approved/accepted, and after copies are at the work site. This phase shall include:

3.6.1.1. A review of each paragraph of applicable specifications, reference codes, and standards. Make a copy of those sections of referenced codes and standards applicable to that portion of the work to be accomplished in the field at the preparatory inspection. Maintain these copies in the field, available for use by Government personnel until final acceptance of the work.

3.6.1.2. A review of the contract drawings.

3.6.1.3. A check to assure that all materials and/or equipment have been tested, submitted, and approved.

3.6.1.4. Review of provisions that have been made to provide required control inspection and testing.

3.6.1.5. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.

3.6.1.6. A physical examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.

3.6.1.7. A review of the appropriate activity hazard analysis to assure safety requirements are met.

3.6.1.8. Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.

3.6.1.9. A check to ensure that the portion of the plan for the work to be performed has been accepted by the Contracting Officer.

3.6.1.10. Discussion of the initial control phase.

3.6.1.11. Notify the Government at least 24 hours in advance of beginning the preparatory control phase. This phase shall include a meeting conducted by the CQC System Manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. Document the results of the preparatory phase actions by separate minutes prepared by the CQC System Manager and attached to the daily CQC report. The Contractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

### 3.6.2. Initial Phase

Accomplish this phase at the beginning of a definable feature of work. Include the following actions:

3.6.2.1. Check work to ensure that it is in full compliance with contract requirements. Review minutes of the preparatory meeting.

3.6.2.2. Verify adequacy of controls to ensure full contract compliance. Verify required control inspection and testing.

3.6.2.3. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with required sample panels as appropriate.

3.6.2.4. Resolve all differences.

3.6.2.5. Check safety to include compliance with and upgrading of the Accident Prevention plan and activity hazard analysis. Review the activity analysis with each worker.

3.6.2.6. Notify the Government at least 24 hours in advance of beginning the initial phase. The CQC System Manager shall prepare and attach to the daily CQC report separate minutes of this phase. Indicate exact location of initial phase for future reference and comparison with follow-up phases.

3.6.2.7. Repeat the initial phase any time acceptable specified quality standards are not being met.

### 3.6.3. Follow-up Phase

Perform daily checks to assure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the particular feature of work. The checks shall be made a matter of record in the CQC documentation. Conduct final follow-up checks and correct deficiencies prior to the start of additional features of work which may be affected by the deficient work. Do not build upon nor conceal non-conforming work.

### 3.6.4. Additional Preparatory and Initial Phases

Conduct additional preparatory and initial phases on the same definable features of work if: the quality of on-going work is unacceptable; if there are changes in the applicable CQC staff, onsite production supervision or work crew; if work on a definable feature is resumed after a substantial period of inactivity; or if other problems develop.

## 3.7. TESTS

### 3.7.1. Testing Procedure

Perform specified or required tests to verify that control measures are adequate to provide a product which conforms to contract requirements and project design documents. Upon request, furnish to the Government

duplicate samples of test specimens for possible testing by the Government. Testing includes operation and/or acceptance tests when specified. The Contractor shall procure the services of a Corps of Engineers approved testing laboratory, or establish an approved testing laboratory at the project site. The Contractor may elect to use a laboratory certified and accredited by the Concrete and cement Reference Laboratory (CCRL) or by AASHTO Materials Reference Laboratory (AMRL) for testing procedures that those organizations certify. The Contractor shall perform the following activities and record and provide the following data:

3.7.1.1. Verify that testing procedures comply with contract requirements and project design documents.

3.7.1.2. Verify that facilities and testing equipment are available and comply with testing standards.

3.7.1.3. Check test instrument calibration data against certified standards.

3.7.1.4. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.

3.7.1.5. Include results of all tests taken, both passing and failing tests, recorded on the CQC report for the date taken. Include specification paragraph reference, location where tests were taken, and the sequential control number identifying the test. If approved by the Contracting Officer, actual test reports may be submitted later with a reference to the test number and date taken. Provide an information copy of tests performed by an offsite or commercial test facility directly to the Contracting Officer. Failure to submit timely test reports as stated may result in nonpayment for related work performed and disapproval of the test facility for this contract.

### 3.7.2. Testing Laboratories

#### 3.7.2.1. Capability Check

The Government reserves the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the contract specifications and to check the laboratory technician's testing procedures and techniques. Laboratories utilized for testing soils, concrete, asphalt, and steel shall meet criteria detailed in ASTM D 3740 and ASTM E 329.

#### 3.7.2.2. Capability Recheck

If the selected laboratory fails the capability check, the Government will assess the Contractor a charge of \$1,375 to reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

#### 3.7.3. Onsite Laboratory

The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests, and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

#### 3.7.4. Furnishing or Transportation of Samples for Government Quality Assurance Testing

The Contractor is responsible for costs incidental to the transportation of samples or materials. Deliver samples of materials for test verification and acceptance testing by the Government to the Corps of Engineers Laboratory, f.o.b., at the following address:

- For delivery by mail:
  - [Not Supplied - ConstructionReqQC : LAB\_NAME]
  - [Not Supplied - ConstructionReqQC : LAB\_ATTEN]
  - [Not Supplied - ConstructionReqQC : LAB\_MAIL]
  - [Not Supplied - ConstructionReqQC : LAB\_STATE]
- For other deliveries:
  - [Not Supplied - ConstructionReqQC : LAB\_NAME\_OTHER]

[Not Supplied - ConstructionReqQC : LAB\_ATTEN\_OTHER]

[Not Supplied - ConstructionReqQC : LAB\_MAIL\_OTHER]

[Not Supplied - ConstructionReqQC : LAB\_STATE\_OTHER]

The area or resident office will coordinate, exact delivery location, and dates for each specific test.

### 3.8. COMPLETION INSPECTION

#### 3.8.1. Punch-Out Inspection

Near the end of the work, or any increment of the work established by a time stated in the SPECIAL CONTRACT REQUIREMENTS Clause, "Commencement, Prosecution, and Completion of Work", or by the specifications, the CQC Manager shall conduct an inspection of the work. Prepare a punch list of items which do not conform to the approved drawings and specifications and include in the CQC documentation, as required by paragraph DOCUMENTATION. The list of deficiencies shall include the estimated date by which the deficiencies will be corrected. The CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected. Once this is accomplished, the Contractor shall notify the Government that the facility is ready for the Government Pre-Final inspection.

#### 3.8.2. Pre-Final Inspection

As soon as practicable after the notification above, the Government will perform the pre-final inspection to verify that the facility is complete and ready to be occupied. A Government Pre-Final Punch List may be developed as a result of this inspection. The Contractor's CQC System Manager shall ensure that all items on this list have been corrected before notifying the Government, so that a Final inspection with the customer can be scheduled. Correct any items noted on the Pre-Final inspection in a timely manner. Accomplish these inspections and any deficiency corrections required by this paragraph within the time slated for completion of the entire work or any particular increment of the work if the project is divided into increments by separate completion dates.

#### 3.8.3. Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, plus the superintendent or other primary management person, and the Contracting Officer's Representative shall attend the final acceptance inspection. Additional Government personnel including, but not limited to, those from Base/Post Civil Facility Engineer user groups and major commands may also attend. The Government will formally schedule the final acceptance inspection based upon results of the Pre-Final inspection. Provide notice to the Government at least 14 days prior to the final acceptance inspection and include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work performed under the contract, will be complete and acceptable by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the contract clause titled "Inspection of Construction".

### 3.9. DOCUMENTATION

3.9.1. Maintain current records providing factual evidence that required quality control activities and/or tests have been performed. These records shall include the work of subcontractors and suppliers using government-provided software, QCS (see Section 01 45 01.10). The report includes, as a minimum, the following information:

3.9.1.1. Contractor/subcontractor and their area of responsibility.

3.9.1.2. Operating plant/equipment with hours worked, idle, or down for repair.

3.9.1.3. Work performed each day, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.

- 3.9.1.4. Test and/or control activities performed with results and references to specifications/drawings requirements. Identify the applicable control phase (Preparatory, Initial, Follow-up). List deficiencies noted, along with corrective action.
- 3.9.1.5. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements.
- 3.9.1.6. Submittals and deliverables reviewed, with contract reference, by whom, and action taken.
- 3.9.1.7. Offsite surveillance activities, including actions taken.
- 3.9.1.8. Job safety evaluations stating what was checked, results, and instructions or corrective actions.
- 3.9.1.9. Instructions given/received and conflicts in plans and/or specifications.
- 3.9.1.10. Provide documentation of design quality control activities. For independent design reviews, provide, as a minimum, identity of the ITR team, the ITR review comments, responses and the record of resolution of the comments.
- 3.9.2. Contractor's verification statement.

These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. Furnish the original and one copy of these records in report form to the Government daily within 24 hours after the date covered by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, submit one report for every 7 days of no work and on the last day of a no work period. Account for all calendar days throughout the life of the contract. The first report following a day of no work shall be for that day only. The CQC System Manager shall sign and date reports. The report shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel. The Contractor may submit these forms electronically, in lieu of hard copy.

### 3.10. NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

End of Section 01 45 04.00 10

**SECTION 01 50 02.0004**  
**TEMPORARY CONSTRUCTION FACILITIES**

**1.0 OVERVIEW**

1.1. GENERAL REQUIREMENTS

1.3. BULLETIN BOARD, PROJECT SIGN, AND PROJECT SAFETY SIGN

## **1.0 OVERVIEW**

### **1.1. GENERAL REQUIREMENTS**

1.1.1. This section contains requirements specifically applicable to this task order. The requirements of Base ID/IQ contract Section 01 50 02 apply to this task order, except as otherwise specified herein.

### **1.3. BULLETIN BOARD, PROJECT SIGN, AND PROJECT SAFETY SIGN**

1.3.1. Bulletin Board (As Specified in Base contract)

1.3.2. Project and Safety Signs (Added to Stress standardization of signs, in the event that the Base ID/IQ Section 01 50 02 does not contain this information)

Erect a project sign and a site safety sign with informational details as provided by the Government at the Post award conference, within 15 days prior to any work activity on project site. Update the safety sign data daily, with light colored metallic or non-metallic numerals. Remove the signs from the site upon completion of the project. Engineer Pamphlet EP 310-1-6a contains the standardized layout and construction details for the signs. It can be found through a GOOGLE Search or try <http://www.usace.army.mil/publications/eng-pamphlets/ep310-1-6a/s-16.pdf>.

End of Section 01 50 02.0004

## SECTION 01 57 23

TEMPORARY STORM WATER POLLUTION CONTROL  
01/08

## PART 1 GENERAL

## 1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

## ASTM INTERNATIONAL (ASTM)

ASTM D 4439	(2004) Geosynthetics
ASTM D 4491	(1999a; R 2004e1) Water Permeability of Geotextiles by Permittivity
ASTM D 4533	(2004) Trapezoid Tearing Strength of Geotextiles
ASTM D 4632	(1991; R 2003) Grab Breaking Load and Elongation of Geotextiles
ASTM D 4751	(2004) Determining Apparent Opening Size of a Geotextile
ASTM D 4873	(2002) Identification, Storage, and Handling of Geosynthetic Rolls and Samples

## 1.2 GENERAL REQUIREMENTS

Implement the storm water pollution prevention measures to prevent sediment from entering streams or water bodies as specified in this Section in conformance with the requirements of Section 01 57 20.00 10 ENVIRONMENTAL PROTECTION, APPENDIX E Environmental Information and the requirements of the National Pollution Discharge Elimination System (NPDES) permit attached to that Section.

## 1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

Pollution prevention plan and Notice of intent for NPDES coverage under the general permit for construction activities

SD-06 Test Reports

Erosion and Sediment Controls



## SD-07 Certificates

## Mill Certificate or Affidavit

Certificate attesting that the Contractor has met all specified requirements.

## 1.4 EROSION AND SEDIMENT CONTROLS

The controls and measures required by the Contractor are described below.

## 1.4.1 Stabilization Practices

The stabilization practices to be implemented include temporary seeding, mulching, geotextiles, sod stabilization, vegetative buffer strips, erosion control matts, protection of trees, preservation of mature vegetation, . On the daily CQC Report, record the dates when the major grading activities occur, (e.g., clearing and grubbing, excavation, embankment, and grading); when construction activities temporarily or permanently cease on a portion of the site; and when stabilization practices are initiated. Except as provided in paragraphs UNSUITABLE CONDITIONS and NO ACTIVITY FOR LESS THAN 21 DAYS, stabilization practices must be initiated as soon as practicable, but no more than 14 days, in any portion of the site where construction activities have temporarily or permanently ceased.

## 1.4.1.1 Unsuitable Conditions

Where the initiation of stabilization measures by the fourteenth day after construction activity temporarily or permanently ceases or is precluded by unsuitable conditions caused by the weather, initiate stabilization practices as soon as practicable after conditions become suitable.

## 1.4.1.2 No Activity for Less Than 21 Days

When the total time period in which construction activity is temporarily ceased on a portion of the site is 21 days minimum, stabilization practices do not have to be initiated on that portion of the site until 14 days have elapsed after construction activity temporarily ceased.

## 1.4.1.3 Burnoff

Burnoff of the ground cover is not permitted.

## 1.4.1.4 Protection of Erodible Soils

Immediately finish the earthwork brought to a final grade, as indicated or specified. Immediately protect the side slopes and back slopes upon completion of rough grading. Plan and conduct earthwork to minimize the duration of exposure of unprotected soils.

## 1.4.2 Erosion, Sediment and Stormwater Control

- a. Submit "Erosion and Sediment Controls" (E&S) (form provided at the pre-construction conference) and to the Contracting Officer once every 7 calendar days and within 24 hours of a storm event that produces 0.5 inch or more of rain.

#### 1.4.3 Structural Practices

Implement structural practices to divert flows from exposed soils, temporarily store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Structural practices must be implemented in a timely manner during the construction process to minimize erosion and sediment runoff. Include the following devices; Show location and details of installation and construction on the drawings.

##### 1.4.3.1 Silt Fences

If used, provide silt fences as a temporary structural practice to minimize erosion and sediment runoff. Properly installed silt fences to effectively retain sediment immediately after completing each phase of work where erosion would occur in the form of sheet and rill erosion (e.g. clearing and grubbing, excavation, embankment, and grading). Install silt fences in the locations indicated on the drawings. Obtain approval from the Contracting Officer prior to final removal of silt fence barriers .

##### 1.4.3.2 Straw Bales

If used, provide bales of straw as a temporary structural practice to minimize erosion and sediment runoff. If bales are used, properly place the bales to effectively retain sediment immediately after completing each phase of work (e.g., clearing and grubbing, excavation, embankment, and grading) in each independent runoff area (e.g., after clearing and grubbing in a area between a ridge and drain, place the bales as work progresses, remove/replace/relocate the bales as needed for work to progress in the drainage area). Show on the drawings areas where straw bales are to be used. The Contracting Officer will approve the final removal of straw bale barriers. Provide rows of bales of straw as follows:

- a. Along the downhill perimeter edge of all areas disturbed.
- b. Along the top of the slope or top bank of drainage ditches, channels, swales, etc. that traverse disturbed areas.
- c. Along the toe of all cut slopes and fill slopes of the construction areas.
- d. Perpendicular to the flow in the bottom of existing drainage ditches, channels, swales, etc. that traverse disturbed areas or carry runoff from disturbed areas. Space rows a maximum of 60 meters (200 feet) apart in drains with slopes equal to or less than 5 percent and 30 meters (100 feet) apart in drains with slopes steeper than 5 percent. If drainage ditches have slopes above and below the 5 percent limit the spacing show on the drawings..
- e. Perpendicular to the flow in the bottom of new drainage ditches, channels, and swales. Space rows a maximum of 60 meters (200 feet) apart in drains with slopes equal to or less than 5 percent and 30 meters (100 feet) apart in drains with slopes steeper than 5 percent. If drainage ditches have slopes above and below the 5 percent limit the spacing show on the drawings..
- f. At the entrance to culverts that receive runoff from disturbed areas.

#### 1.4.3.3 Diversion Dikes

If used, build diversion dikes with a maximum channel slope of 2 percent and adequately compacted to prevent failure. The minimum height measured from the top of the dike to the bottom of the channel must be 18 inches. The minimum base width must be 6 feet and the minimum top width must be 2 feet. Ensure that the diversion dikes are not damaged by construction operations or traffic. Locate diversion dikes on the drawings.

#### 1.4.4 Sediment Basins

If used, trap sediment in temporary (unless permanent are required) sediment basins. Select a basin size to accommodate the runoff of the specified local storm year. Pump dry and remove the accumulated sediment, after each storm. Use a paved weir or vertical overflow pipe for overflow. Remove collected sediment from the site. Institute effluent quality monitoring programs.

Install, inspect, and maintain best management practices (BMPs) as required by the general permit. Prepare BMP Inspection Reports as required by the general permit. If required by the permit, include those inspection reports.

#### 1.4.5 Vegetation and Mulch

- a. If used, provide temporary protection on sides and back slopes as soon as rough grading is completed or sufficient soil is exposed to require erosion protection. Protect slopes by accelerated growth of permanent vegetation, temporary vegetation, mulching, or netting. Stabilize slopes by hydroseeding, anchoring mulch in place, covering with anchored netting, sodding, or such combination of these and other methods necessary for effective erosion control.
- b. Seeding: If used, provide new seeding where ground is disturbed. Include topsoil or nutriment during the seeding operation necessary to establish, or reestablish, a suitable stand of grass. The seeding operation will be as specified in UFGS Guide Specification 32 92 19 SEEDING.

### PART 2 PRODUCTS

#### 2.1 COMPONENTS FOR SILT FENCES

##### 2.1.1 Filter Fabric

The geotextile must comply with the requirements of ASTM D 4439, and consist of polymeric filaments which are formed into a stable network such that filaments retain their relative positions. The filament must consist of a long-chain synthetic polymer composed of at least 85 percent by weight of ester, propylene, or amide, and contain stabilizers and/or inhibitors added to the base plastic to make the filaments resistance to deterioration due to ultraviolet and heat exposure. Synthetic filter fabric must contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life at a temperature range of 0 to 120 degrees F. The filter fabric must meet the following requirements:

##### FILTER FABRIC FOR SILT SCREEN FENCE

PHYSICAL PROPERTY	TEST PROCEDURE	STRENGTH REQUIREMENT
Grab Tensile Elongation (percent)	ASTM D 4632	100 lbs. min. 30 percent max.
Trapezoid Tear	ASTM D 4533	55 lbs. min.
Permittivity	ASTM D 4491	0.2 sec-1
AOS (U.S. Std Sieve)	ASTM D 4751	20-100

#### 2.1.2 Silt Fence Stakes and Posts

Use either wooden stakes or steel posts for fence construction. Wooden stakes utilized for silt fence construction, must have a minimum cross section of 2 by 2 inches when oak is used and 4 by 4 inches when pine is used, and have a minimum length of 5 feet. Steel posts (standard "U" or "T" section) utilized for silt fence construction, must have a minimum weight of 1.33 pounds/linear foot and a minimum length of 5 feet.

#### 2.1.3 Mill Certificate or Affidavit

Provide a mill certificate or affidavit attesting that the fabric and factory seams meet chemical, physical, and manufacturing requirements specified above. The mill certificate or affidavit must specify the actual Minimum Average Roll Values and identify the fabric supplied by roll identification numbers. Submit a mill certificate or affidavit signed by a legally authorized official from the company manufacturing the filter fabric.

#### 2.1.4 Identification Storage and Handling

Filter fabric must be identified, stored and handled in accordance with ASTM D 4873.

### 2.2 COMPONENTS FOR STRAW BALES

The straw in the bales must be stalks from oats, wheat, rye, barley, rice, or from grasses such as byhalia, bermuda, etc., furnished in air dry condition. The bales must have a standard cross section of 14 by 18 inches. Wire-bound or string-tie all bales. The Contractor may use either wooden stakes or steel posts to secure the straw bales to the ground. Wooden stakes utilized for this purpose, must have a minimum dimensions of 2 by 2 inches in cross section and have a minimum length of 3 feet. Steel posts (standard "U" or "T" section) utilized for securing straw bales, must have a minimum weight of 1.33 pounds/linear foot and a minimum length of 3 feet.

## PART 3 EXECUTION

### 3.1 INSTALLATION OF SILT FENCES

Extend silt fences a minimum of 16 inches above the ground surface and not exceed 34 inches above the ground surface. Filter fabric must be from a continuous roll cut to the length of the barrier to avoid the use of joints. When joints are unavoidable, splice together filter fabric at a support post, with a minimum 6 inch overlap, and securely sealed. Excavate trench approximately 4 inches wide and 4 inches deep on the upslope side of the location of the silt fence. The 4 by 4 inch trench must be backfilled and the soil compacted over the filter fabric. Remove silt fences upon

approval by the Contracting Officer.

### 3.2 INSTALLATION OF STRAW BALES

Place the straw bales in a single row, lengthwise on the contour, with ends of adjacent bales tightly abutting one another. Install straw bales so that bindings are oriented around the sides rather than along the tops and bottoms of the bales in order to prevent deterioration of the bindings. Entrench and backfill the barrier. Excavate a trench the width of a bale and the length of the proposed barrier to a minimum depth of 4 inches. After the bales are staked and chinked (gaps filled by wedging with straw), backfill the excavated soil against the barrier. Conform the backfill soil with the ground level on the downhill side and build up to 4 inches against the uphill side of the barrier. Scatter loose straw over the area immediately uphill from a straw bale barrier to increase barrier efficiency. Securely anchor each bale by at least two stakes driven through the bale. Drive the first stake or steel post in each bale toward the previously laid bale to force the bales together. Stakes or steel pickets must be driven a minimum 18 inches deep into the ground to securely anchor the bales.

### 3.3 MAINTENANCE

Maintain the temporary and permanent vegetation, erosion and sediment control measures, and other protective measures in good and effective operating condition by performing routine inspections to determine condition and effectiveness, by restoration of destroyed vegetative cover, and by repair of erosion and sediment control measures and other protective measures. Use the following procedures to maintain the protective measures.

#### 3.3.1 Silt Fence Maintenance

Inspect the silt fences in accordance with paragraph, entitled "Inspections," of this section. Any required repairs shall be made promptly. Pay close attention to the repair of damaged silt fence resulting from end runs and undercutting. Should the fabric on a silt fence decompose or become ineffective, and the barrier is still necessary, replace the fabric promptly. Remove sediment deposits when deposits reach one-third of the height of the barrier. Remove a silt fence when it is no longer required. The immediate area occupied by the fence and any sediment deposits must be shaped to an acceptable grade. The areas disturbed by this shaping must be seeded in accordance with UFGS Guide Specification 32 05 33 LANDSCAPE ESTABLISHMENT, except that the coverage requirements in paragraph, entitled "Establishment" of this section do not apply.

#### 3.3.2 Straw Bale Maintenance

Inspect straw bale barriers in accordance with paragraph, entitled "Inspections". Pay close attention to the repair of damaged bales, end runs and undercutting beneath bales. Necessary repairs to barriers or replacement of bales must be accomplished promptly. Remove sediment deposits when deposits reach one-half of the height of the barrier. At the each end of each row turn bales uphill when used to retain sediment. Remove a straw bale barrier when it is no longer required. The immediate area occupied by the bales and any sediment deposits must be shaped to an acceptable grade. The areas disturbed by this shaping must be seeded in accordance with UFGS Guide Specification 32 92 19 SEEDING.

### 3.3.3 Diversion Dike Maintenance

Inspect diversion dikes in accordance with paragraph, entitled "Inspections," of this section. Pay close attention to the repair of damaged diversion dikes and accomplish necessary repairs promptly. When diversion dikes are no longer required shape to an acceptable grade. The areas disturbed by this shaping must be seeded in accordance with UFGS Guide Specification 32 92 19 SEEDING.

## 3.4 INSPECTIONS

### 3.4.1 General

Inspect disturbed areas of the construction site, areas that have not been finally stabilized used for storage of materials exposed to precipitation, stabilization practices, structural practices, other controls, and area where vehicles exit the site at least once every seven (7) calendar days and within 24 hours of the end of any storm that produces 0.5 inches or more rainfall at the site. Conduct inspections at least once every month where sites have been finally stabilized.

### 3.4.2 Inspections Details

Inspect disturbed areas and areas used for material storage that are exposed to precipitation for evidence of, or the potential for, pollutants entering the drainage system. Observe erosion and sediment control measures to ensure that they are operating correctly. Inspect discharge locations or points to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Inspect locations where vehicles exit the site for evidence of offsite sediment tracking.

### 3.4.3 Inspection Reports

For each inspection conducted, prepare a report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, maintenance performed, and actions taken. Furnish the report to the Contracting Officer within 24 hours of the inspection as a part of the Contractor's daily CQC REPORT. A copy of the inspection report must be maintained on the job site.

-- End of Section --



REPORT OF SUBSURFACE INVESTIGATION  
AND  
GEOTECHNICAL ENGINEERING SERVICES

**Army and Marine AIT Barracks-PN 36113/Feasibility Study**  
Fort Lee, Virginia

**G E T Project No: VB09-283G**  
**November 19, 2009**

Prepared for:

**AECOM**  
448 Viking Drive, Suite 145  
Virginia Beach, VA 23452

204 Grayson Road, Virginia Beach, VA 23462  
Phone 757-518-1703 ♦ Fax 757-518-1704 ♦ [www.getsolutionsinc.com](http://www.getsolutionsinc.com)

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November 19, 2009

TO: **AECOM**448 Viking Drive, Suite 145  
Virginia Beach, VA 23452

Attn: Mr. Paul T. Garrison, PE, CEM, LEED AP

RE: Report of Subsurface Investigation &amp; Geotechnical Engineering Services

**Army and Marine AIT Barracks-PN 36113-Feasibility Study**

Fort Lee, Virginia

**GET** Project No: VB09-283G

Dear Mr. Garrison:

In compliance with your instructions, we have completed our Subsurface Investigation and Geotechnical Engineering Services for the referenced project. The results of this feasibility Study, together with our recommendations, are presented in this report.

Often, because of design and construction details that occur on a project, questions arise concerning subsurface conditions. **G E T Solutions, Inc.** would be pleased to continue its role as Geotechnical Engineer during the final design phase and project implementation.

Thank you for the opportunity to work with you on this project. We trust that the information contained herein meets your immediate need, and should you have any questions or if we could be of further assistance, please do not hesitate to contact us.

Respectfully Submitted,  
**G E T Solutions, Inc.**Maria E. Murdock, P.E.  
Project Engineer  
VA Reg. # 039988D. Mark Scholefield, P.E.  
Senior Project Engineer  
VA Lic. #033932

Copies: (1) Client

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## **EXECUTIVE SUMMARY**

This project consists of constructing an Advanced Individual Trainee (AIT) Barracks Complex to accommodate 600 soldiers in the Fort Lee facility, Virginia. The site for Marine AIT Barracks is located between Buildings # 6241 and 6240. The proposed site for the Army AIT Barracks is located behind the existing Commissary (Building # 1600). The proposed structures are expected to be five-stories high. Associated paved parking areas, roadways and other infrastructure components will also be constructed at the sites.

Our field exploration program included two (2) 50-foot deep, two (2) 35-foot deep and two (2) 15-foot deep Standard Penetration Test (SPT) borings at each of the two sites. Additionally, a total for three (3) bulk soil samples were collected from the subgrade elevation for CBR testing and one temporary groundwater monitoring well was installed at each of the sites.

The groundwater level was recorded at the boring locations and as observed through the wetness of the recovered soil samples during the drilling operations. The groundwater table was measured to occur at depths of approximately 18 to 22 feet below current grades at the boring locations.

At the time of this reporting the anticipated structural loads are unknown, thus we are presenting two foundation types, which are dependent on the structural loads.

If the structural loads are below 500 kips (column) and/or 12 klf (walls), then the buildings can be supported on shallow foundations. Otherwise, the structures may require a deep foundation system to support the framing.

The following evaluations and recommendations were developed based on our field exploration and laboratory-testing program:

- A field testing program is recommended during construction. This testing program should include as a minimum, subgrade load testing (proofrolling), test pits, compaction testing, and foundation excavation observation for bearing capacity verification or pile installation monitoring (depending on foundation type).
- A cut of up to 6 inches in depth will be required to remove the topsoil material and a cut of up to 9 inches in depth will be required to remove the pavement section, as applicable.
- Some subgrade improvements should be anticipated within the construction areas (undercutting and backfilling with select fill) as a result of potentially unsuitable/unstable cohesive subgrade soils.

Report of Subsurface Investigation &amp; Geotechnical Engineering Services

November 19, 2009

**Army and Marine AIT Barracks-PN 36113-Feasibility Study**

Fort Lee, Virginia

GET Project No: VB09-283G

- In the case of shallow foundation support (maximum column loads less than 500 kips and maximum wall loads less than 12 klf), the footings should be designed using a net allowable bearing capacity of 3,000 psf (48-inch embedment, 24-inch width).
- In the case of deep foundation support (maximum column and wall loads in excess of 500 kips and 12 klf) the buildings framing should be supported on driven square precast prestressed concrete (SPPC) piles.

Pile Type	Estimated Embedment Depth (ft)*	Estimated Allowable Compression Capacity (tons)	Estimated Allowable Tension Capacity (tons)	Estimated Allowable Lateral Capacity (tons)**	Pre-Augering Depth (ft)
<b>Army AIT Barracks/Site A</b>					
12" SPPC	30 - 35	45 - 55	15	4	15
<b>Marine AIT Barracks/Site B</b>					
12" SPPC	65 - 70	65 - 75	30	4	15

\* Pile refusal at shallower depths should be expected as a result of soil densification during driving of subsequent piles in a single cap, embedment depth references current grades.

\*\* Lateral capacity computed for a lateral load applied at the pile butt level, at ground level for a maximum butt deflection of ½ inch. Batter piles would enhance lateral capacity.

- Estimated post-construction total and differential settlements for shallow foundations up to 1-inch and ½-inch, respectively.
- The structural slabs may be supported as slab-on-grade members.
- The pavements should be designed using an estimated CBR Value ranging from 5 to 7.
- Based on our experience with similar construction in the general area of the project site, the site is within a site class 'D' in accordance with Table 1615.1.1 of the 2006 International Building Code.

This summary briefly discusses some of the major topics mentioned in the attached report. Accordingly, this report should be read in its entirety to thoroughly evaluate the contents.

Report of Subsurface Investigation & Geotechnical Engineering Services  
**Army and Marine AIT Barracks-PN 36113-Feasibility Study**  
Fort Lee, Virginia  
GET Project No: VB09-283G

November 19, 2009

## **1.0 PROJECT INFORMATION**

### **1.1 Project Authorization**

**G E T Solutions, Inc.** has completed our subsurface investigation and geotechnical engineering services for the Army and Marine AIT Barracks in Fort Lee, Virginia. The geotechnical engineering services were conducted in general accordance with the scope presented in the **G E T** Proposal No. PVB09-469G dated October 2, 2009. Authorization to proceed with our services was received from Mr. Paul Garrison, PE, CEM, LEED AP, with AECOM in the form of a signed Agreement of Subconsulting Services dated October 19, 2009.

### **1.2 Project Site Location and Construction Description**

This project consists of constructing an Advanced Individual Trainee (AIT) Barracks Complex to accommodate 600 soldiers on the Fort Lee Facility. The site for Marine AIT Barracks (Site B) is located between Buildings # 6241 and 6240. This site currently includes an asphalt parking lot and several existing utilities which will be demolished and removed prior to construction. The proposed site for the Army AIT Barracks (Site A) is located behind the existing Commissary (Building # 1600).

The proposed structures are expected to be five-stories high. The structural loads of the two proposed buildings were unknown at the time of this reporting. It is anticipated that 1 to 2 feet of fill will be required to be placed within the proposed buildings footprints in order to establish the design first floor finish elevations. Associated paved parking areas, roadways and other infrastructure components will also be constructed at the sites.

***If any of the noted information is incorrect or has changed, please inform G E T Solutions, Inc. so that we may amend the recommendations presented in this report, if appropriate.***

### **1.3 Purpose and Scope of Services**

The purpose of this feasibility study was to obtain information on the general subsurface conditions at the proposed project site. The subsurface conditions encountered were then evaluated with respect to the available project characteristics. In this regard, engineering assessments for the following items were formulated:

1. General assessment of the soils revealed by the borings performed at the proposed development.
2. General location and description of potentially deleterious material encountered in the borings that may interfere with construction progress or structure performance, including existing fills or surficial/subsurface organics.

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3. Soil subgrade preparation, including stripping, grading and compaction. Engineering criteria for placement and compaction of approved structural fill material.
4. Construction considerations for fill placement, subgrade preparation, and foundation excavations.
5. Feasibility of utilizing a shallow or deep foundation system for support of the proposed structures' frame (depending on the estimated structural loads). For the shallow foundation system the design parameters required for the preliminary foundation system will be provided, including foundation sizes, allowable bearing pressures, foundation levels and expected total and differential settlements.  
  
For the deep foundation system preliminary design parameters required for the foundation system will be provided, including pile type, pile length, allowable capacities, and expected total and differential settlements. Also, pile installation and testing criteria is evaluated and discussed in this report.
6. Typical pavement sections based on the field exploration activities and our experience with similar soil conditions.
7. Seismic site class determination in accordance with the 2006 International Building Code.

The scope of services did not include an environmental assessment for determining the presence or absence of wetlands or hazardous or toxic material in the soil, bedrock, surface water, groundwater or air, on or below or around this site.

## **2.0 FIELD AND LABORATORY PROCEDURES**

### **2.1 Field Exploration**

In order to explore the general subsurface soil types and to aid in developing associated preliminary foundation and pavement design parameters, the exploration presented in Table I was performed in the proposed construction areas.



**Table I – Subsurface Field Exploration**

<b>Type of Boring</b>	<b>Army AIT Barracks/Site A</b>	<b>Marine AIT Barracks/Site B</b>
<b>Building Borings</b>	Four (4) 35- and 50-foot deep Standard Penetration Test (SPT) borings (designated as B-1(A) through B-4(A))	Four (4) 35- and 50-foot deep SPT borings (designated as B-1(B) through B-4(B))
<b>Pavement Borings</b>	Two (2) 15-foot deep SPT borings (designated as B-5(A) and B-6(A)). In addition one bulk soil sample was collected at each boring location from the approximate subgrade elevations. The bulk soil samples were returned to our laboratory and subjected to CBR testing in accordance with VTM standards.	Two (2) 15-foot deep SPT borings (designated as B-5(B) and B-6(B)). In addition a bulk soil sample was collected at the boring location B-6(B) from the approximate subgrade elevation. The bulk soil sample was returned to our laboratory and subjected to CBR testing in accordance with VTM standards
<b>BMP Borings</b>	One (1) 25-foot deep temporary groundwater monitoring well was installed at the project site.	One (1) 25-foot deep temporary groundwater monitoring well was installed at the project site.

Standard Penetration Tests (SPT) were performed in the field in general accordance with ASTM D 1586. The tests were performed continuously from the existing ground surface to a depth of 12 feet, and at 5-foot intervals thereafter. The soil samples were obtained with a standard 1.4" I.D., 2" O.D., 30" long split-spoon sampler. The sampler was driven with blows of a 140 lb. hammer falling 30 inches. The number of blows required to drive the sampler each 6-inch increment of penetration was recorded and is shown on the boring logs. The sum of the second and third penetration increments is termed the SPT N-value. A representative portion of each disturbed split-spoon sample was collected with each SPT, placed in a glass jar, sealed, labeled, and returned to our laboratory for review.

One (1) thin-walled tube sample was obtained from the CLAY stratum, by hydraulically pressing a 3-inch outside diameter Shelby tube into the soils. Specifically, the tube sample was obtained at the location of borings B-2(B) at depths ranging from 33 to 35 feet below the existing site grades at the Marine AIT Barracks. The tube was sealed to prevent moisture loss and returned to the laboratory for extraction, classification and consolidation testing. A second Shelby tube was attempted to be extracted from the very stiff CLAY stratum recovered from depths of 13 to 15 feet below grades at the location of boring B-2 (A) within the Army AIT Barracks site. However, due to the very stiff consistency of the CLAY stratum the Shelby tube could not be extracted.

The SPT boring locations were established, located and staked in the field by a representative of **GET Solutions, Inc.** The approximate boring locations are shown on the "Boring Location Plans" attached to this report (Appendix I).

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**2.2 Laboratory Testing**

Representative portions of all soil samples collected during drilling were sealed in glass jars, labeled and transferred to our laboratory for classification and analysis. The soil classification was performed by a Geotechnical Engineer in accordance with ASTM D 2488.

Twelve (12) representative soil samples were selected and subjected to laboratory testing which included natural moisture, -#200 sieve wash and Atterberg Limits testing and analysis, in order to corroborate the visual classification. These test results are provided in the following table (Table II) and are presented on the "Log of Boring" sheets (Appendix II), included with this report.

**Table II – Laboratory Test Results**

<b>Boring No.</b>	<b>Depth (Feet)</b>	<b>Natural Moisture (%)</b>	<b>% Passing #200</b>	<b>Atterberg Limits (LL/PL/PI)</b>	<b>USCS Classification</b>
<b>Army AIT Barracks/Site A</b>					
B-2(A)	13-15	33	96	73/30/43	CH
B-2(A)	23-25	24	11	Non-Plastic	SP-SM
B-3(A)	6-8	24	71	68/23/45	CH
B-3(A)	28-30	10	10	Non-Plastic	SP-SM
B-4(A)	4-6	20	66	56/20/36	CH
B-4(A)	23-25	20	17	Non-Plastic	SM
<b>Marine AIT Barracks/Site B</b>					
B-1(B)	33-35	50	93	61/21/40	CH
B-2(B)	10-12	20	32	Non-Plastic	SM
B-2(B)	38-40	52	97	62/22/40	CH
B-3(B)	18-20	23	13	Non-Plastic	SM
B-3(B)	28-30	58	96	65/22/43	CH
B-4(B)	13-15	24	30	Non-Plastic	SM

In addition, the bulk soil samples were subjected to Atterberg Limits, natural moisture content, - # 200 sieve, standard Proctor, and CBR testing in accordance with ASTM and VTM standards. At the time of this reporting the CBR testing was still in progress. The laboratory test results will be submitted in the form of an Addendum to this report upon their completion.

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One (1) one-dimensional consolidation test was being performed at the time of this reporting on the specimen from the Shelby tube sample obtained at the location of boring B-2(B) at depths ranging from 33 to 35 feet below the existing site grades. The consolidation test is performed at our Virginia Beach laboratory in general accordance with ASTM D 2435. A representative specimen from the Shelby tube is also subjected to natural moisture content, Atterberg Limits, and -#200 sieve testing. The result of the consolidation test will be provided at a further date as an addendum to this report.

### **3.0 SUBSURFACE CONDITIONS**

#### **3.1 Site Geology**

The project site lies within a major physiographic province called the Atlantic Coastal Plain. Numerous transgressions and regressions of the Atlantic Ocean have deposited marine, lagoonal, and fluvial (stream lain) sediments. The regional geology is very complex, and generally consists of interbedded layers of varying mixtures of sands, silts and clays. Based on our review of existing geologic and soil boring data, the geologic stratigraphy encountered in our subsurface explorations generally consisted of marine deposited sands and clays.

#### **3.2 Subsurface Soil Conditions**

The subsurface soil conditions at each of the sites are presented in Tables III and IV.

**Table III - Subsurface Soil Conditions for Army AIT Barracks/Site A**

<b>AVERAGE DEPTH (Feet)</b>	<b>STRATUM</b>	<b>DESCRIPTION</b>	<b>RANGES OF SPT<sup>(1)</sup> N-VALUES</b>
0 to 0.5	Topsoil	4 to 6 inches of topsoil at the location of borings B-2(A), B-5(A) and B-6(A)	--
0 to 0.3-0.8	Pavement Section	3.3 to 4.5 inches of pavement underlain by 2.7 to 4.5 inches of aggregate base material	
0.3-0.8 to 2	Fill	Silty SAND (SM) with Clay and wood chips at the location of Boring B-4(A)	5
0.3-2 to 6-19	I	CLAY (CH) with varying amounts of Sand.	4 - 29 Average 15
6-9 to 15/35/50	II	SAND (SM, SP-SM, SC) and GRAVEL (GP-GM) with varying amounts of Silt and Clay. <i>* Deposits of stiff to very stiff CLAY (CL, CH) were recovered from this layer from borings B-2(A) and B-5(A)</i>	4 - 63

Note (1) SPT = Standard Penetration Test, N-Values in Blows-per-foot

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**Table IV - Subsurface Soil Conditions for Marine AIT Barracks/Site B**

AVERAGE DEPTH (Feet)	STRATUM	DESCRIPTION	RANGES OF SPT <sup>(1)</sup> N-VALUES
0 to 0.5	Topsoil	3 to 6 inches of topsoil at the location of borings B-1(B) through B-5(B)	--
0 to 0.8	Pavement Section	6 inches of pavement underlain by 3 inches of aggregate base material at the location of boring B-6(B)	
0.3 to 2-4	Fill	SAND (SM, SC) with Silt, Gravel, fibrous organics and Clay and CLAY (CL) with Sand at the location of borings B-1(B), B-3(B) and B-4(B)	7 - 17
0.3-2.4 to 6-13	I	CLAY (CH) with varying amounts of Sand. <i>* Borings B-5 and B-6 were terminated within this layer.</i> <i>* Deposits of medium dense SAND (SM) were recovered from this layer at the location of borings B-1(B) and B-6(B).</i>	3 - 43 Average 23
6-13 to 28-40	II	SAND (SM, SP-SM, SC) with Clay and Silt.	5 - 32
28-40 to 35-50	II	CLAY (CL, CH) with trace Sand <i>* A deposit of GRAVEL (GP-SP) was recovered from this layer at the location B-2(B).</i>	WOH <sup>(2)</sup> - 10

Note (1) SPT = Standard Penetration Test, N-Values in Blows-per-foot

Note (2) WOH = Weight of Hammer

### 3.3 Shrink/Swell Characteristics

The soils recovered during our field exploration were tested and evaluated for their potential to expand or contract with moisture changes (typically termed shrink-swell). Shallow foundations constructed on expansive soils (Clays) at certain depths may be subjected to detrimental uplift forces caused by the swelling of these soils as a result of an increase in the moisture content. As these clays loose moisture they may conversely shrink. This situation can adversely affect the foundation.

The most important fact to remember is that swelling and shrinking will only take place if moisture changes occur, which can be induced by change in weather conditions, leaky pipes, poor drainage and site layout (i.e. reduction of trees, elevation change etc.). The depth of the soil influenced by weather conditions is termed the "active depth", which will vary due to weather changes, locality and the presence or absence of ground water. Soils encountered below the active zone may possess the characteristics for potential shrink/swell, but since the water content of the soil is constant volume changes will not take place. The local active depth associated with the change in weather conditions generally extends to about 3 to 10 feet below existing grades depending on the region, and site topography.

Many researchers have developed relationships between the shrink/swell potential and various soil properties. Liquid Limit (LL) and Plasticity Index (PI) testing are commonly used as indicators of shrink/swell potential, with the higher PI's resulting in higher shrink/swell potential. Several publications recognize soils with PI's of 25 or more as marginal to high potential shrink/swell soils, conversely soils with PI's of 24 or less are considered to be of low shrink/swell potential.

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### 3.4 On-site Shrink/Swell Properties

The cohesive soils encountered to depths up to 10 feet below existing grades are considered to have a moderate to high shrink/swell potential as indicated by the classification testing of the recovered soils. Accordingly, the foundation design criteria required to accommodate shrink/swell concerns consists of embedding the footings beneath the active zone, as presented in this report (footing embedment of 48 inches or more).

In order to minimize shrink/swell concerns and possibilities, the following preventive measures are typically practiced:

- Do not plant deep-rooted trees and shrubs within 10 feet of the foundations.
- Moderately moisten the soils within 5 feet of the foundations during hot weather conditions.
- Tie roof drains to the storm water system and situate downspouts in such a manner as to prevent ponding water near the foundation.

### 3.5 Groundwater Information

The groundwater level was recorded at the boring locations and as observed through the wetness of the recovered soil samples during the drilling operations. The boreholes were backfilled upon completion for safety considerations, thus the readings may not be indicative of the static groundwater level. In addition, 24-hour groundwater readings were taken at the temporary groundwater monitoring wells located at borings B-6(A) (Army Barracks Site) and B-5(B) (Marine Barracks Site). The groundwater table measurements are presented in Table V.

**Table V – Groundwater Readings**

BORING	INITIAL GROUNDWATER READING	24-HOUR GROUNDWATER READING
<b>Army AIT Barracks/Site A</b>		
B-1(A) through B-4(A)	18 to 22 feet below grades	-
B-5(A)	-	-
B-6(A)	-	- (*)
<b>Marine AIT Barracks/Site B</b>		
B-1(B) through B-4(B)	18 feet below grades	-
B-5(B)	-	18.6 feet below grades
B-6(B)	-	-

*Note: (\*) A groundwater well was installed at the location of boring B-6(A); however, the well was damaged and a groundwater reading was not obtained.*

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Groundwater conditions will vary with environmental variations and seasonal conditions such as the frequency and magnitude of rainfall patterns and tides, as well as, man-made influences, such as existing swales, drainage ponds, under-drains and areas of covered soil (paved parking lots, side walks, etc.). In the project's area, seasonal groundwater fluctuations of  $\pm 2$  feet are common; however, greater fluctuations have been documented. Again, we recommend that the contractor determine the actual groundwater levels at the time of the construction to determine groundwater impact on the construction procedures, if necessary.

#### **4.0 PRELIMINARY EVALUATION AND RECOMMENDATIONS**

The project structural loads were not known at the time of this reporting, thus two foundation scenarios are being presented. In Alternative I, the maximum structural loads are estimated to less than 500 kips (column) and 12 klf (walls). In this scenario shallow foundation support is recommended. In Alternative II, the maximum column and wall loads are estimated to be greater than 500 kips and 12 klf, respectively, thus requiring deep foundation support. Detailed recommendations are provided in the following sections of the report.

##### **4.1 Clearing and Grading**

The proposed construction areas should be cleared by means of removing the pavement section, topsoil, root mat (where applicable), or any otherwise unsuitable materials. It is estimated that a cut of up to 6 inches in depth will be required to remove the topsoil material and a cut of up to 9 inches in depth will be required to remove the pavement section recovered from the Army Barracks site. This cut is expected to extend deeper in isolated areas to remove deeper deposits of unsuitable soils, which become evident during the clearing. It is recommended that the clearing operations extend laterally at least 5 feet beyond the perimeter of the proposed construction area. Additionally, it is recommended to remove all utilities from within the proposed construction area, which could result in a cut of 2 feet or more. The resulting excavations should be backfilled with structural fill, as described in Section 4.3 of this report.

Following the initial clearing, the resulting exposed subgrade will generally be comprised of soils containing an appreciable amount of fines (Silt and Clay). Accordingly, combinations of excess surface moisture from precipitation ponding on the site and the construction traffic, including heavy compaction equipment, may create pumping and general deterioration of the bearing capabilities of the surface soils. Therefore, undercutting to remove loose/soft soils and providing a stable working platform for the construction equipment should be expected. The extent of the undercut will be determined in the field during construction based on the outcome of the field testing procedures (subgrade proofroll). In this regard, and in order to reduce undercutting, care should be exercised during the grading and construction operations at the site.



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Inherently wet subgrade soils combined with potential poor site drainage make this site particularly susceptible to subgrade deterioration. Thus, grading should be performed during a dry season if at all possible. This should minimize these potential problems, although they may not be eliminated. The project's budget should include an allowance for subgrade improvements.

#### 4.2 Subgrade Preparation

Following the clearing operation, the exposed subgrade soils should be densified with a large static drum roller. After the subgrade soils have been densified, they should be evaluated by **G E T Solutions, Inc.** for stability. Accordingly, the subgrade soils should be proofrolled to check for pockets of loose material hidden beneath a crust of better soil. Several passes should be made by a large rubber-tired roller or loaded dump truck over the construction areas, with the successive passes aligned perpendicularly. The number of passes will be determined in the field by the Geotechnical Engineer depending on the present soil conditions. Any pumping and unstable areas observed during proofrolling (beyond the initial cut) should be undercut and/or stabilized at the directions of the Geotechnical Engineer. Again, these stabilization procedures will be required to provide a stable working platform for the construction equipment.

In addition to the proofroll, several 2- to 4-foot deep test pits should be excavated in the vicinity of boring location B-4(A) (Army Barracks Site) and borings B-1(B), B-3(B) and B-4(B) (Marine Barracks Site). The test pits are considered necessary to determine the thickness and composition of the fill/possible fill materials and thus the suitability for them to remain in-place beneath the slabs and pavements. The test pits should be performed under the observation of a representative **G E T Solutions, Inc.**, who will evaluate the composition of the recovered soils. It is possible that some subgrade improvements will be required to provide suitable soils for pavement and building support. Recommendations concerning the subgrade improvements (as necessary) will be provided in the field following the testing procedures. The project's budget should include an allowance for subgrade improvements (undercut and backfill with structural fill). In particular neighboring projects have required additional subgrade undercutting to allow for 12 inches of select fill beneath all pavements.

#### 4.3 Structural Fill and Placement

Following the approval of the natural subgrade soils by the Geotechnical Engineer, the placement of the fill required to establish the design grades may begin. Any material to be used for backfill or structural fill should be evaluated and tested by **G E T Solutions, Inc.** prior to placement to determine if they are suitable for the intended use. Suitable structural fill material should consist of sand or gravel containing less than 25% by weight of fines (SM, SP, SW, GP, GW), having a liquid limit less than 15 and plastic limit less than 5, and should be free of rubble, organics, clay, debris and other unsuitable material.

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All structural fill should be compacted to a dry density of at least 98 percent of the standard Proctor maximum dry density (ASTM D1557). In general, the compaction should be accomplished by placing the fill in maximum 8-inch loose lifts and mechanically compacting each lift to at least the specified minimum dry density. A representative of **G E T Solutions, Inc.** should perform field density tests on each lift as necessary to assure that adequate compaction is achieved.

Backfill material in utility trenches within the construction areas should consist of structural fill (as previously described), and should be compacted to at least 98 percent of ASTM D1557. This fill should be placed in 4 to 6 inch loose lifts when hand compaction equipment is used.

Care should be used when operating the compactors near existing structures to avoid transmission of the vibrations that could cause settlement damage or disturb occupants. In this regard, it is recommended that the vibratory roller remain at least 25 feet away from existing structures; these areas should be compacted with small, hand-operated compaction equipment.

#### **4.4 Suitability of On-site Soils**

Based on our visual classification, the CLAY soils recovered at the boring locations (upper 6 to 18 feet) are not expected to be suitable for reuse as structural fill. Further classification testing (natural moisture content, gradation analysis, and Proctor testing) should be performed in the field during construction to evaluate any proposed fill soils.

#### **4.5 Shallow Foundation Design Recommendations-Alternative I (Maximum Column Loads of 500 kips, Maximum Wall Loads of 12 klf)**

The buildings can be supported on shallow spread footings bearing in firm, natural soils or compacted structural fill (compacted to at least 98% of the Modified Proctor maximum dry density, ASTM Specification D 1557). In this regard, footings can be designed for a net allowable bearing pressure of 3,000 psf. In using net pressures, the weight of the footings and backfill over the footings, including the weight of the floor slab, need not be considered. Hence, only loads applied at or above the finished floor need to be used for dimensioning the footings.

In order to develop the recommended bearing capacity of 3,000 pounds per square foot (psf), the base of the footings should have an embedment of at least 48 inches beneath finished grades and wall footings should have a minimum width of 24 inches. In addition, isolated square column footings are recommended to be a minimum of 3 feet by 3 feet in area for bearing capacity consideration. The recommended 48-inch footing embedment is considered sufficient to provide adequate cover against frost penetration to the bearing soils and for shrink/swell considerations (see Section 3.4 of this report).



#### **4.6 Shallow Foundation Settlements-Alternative I**

It is estimated that, with proper site preparation, the maximum resulting post construction total settlement of the foundation of the proposed buildings should be up to 1 inch. The maximum differential settlement magnitude is expected to be less than ½ -inch between adjacent footings (wall footings and column footings of widely varying loading conditions). The settlements were estimated on the basis of the results of the SPT borings. Careful field control will contribute substantially towards minimizing the settlements.

#### **4.7 Shallow Foundation Excavations-Alternative I**

In preparation for shallow foundation support, the footing excavations should extend into firm natural soil or well compacted structural fill. Based on the recommended clearing depths, and given the proposed building finished floor elevation is expected to coincide with the existing site grades, the foundation bearing soils are expected to be comprised of CLAY (CL, CH). All foundation excavations should be observed by a qualified inspector. At that time, the inspector should also explore the extent of excessively loose, soft, or otherwise unsuitable material within the exposed excavations. Also, at the time of footing observations, the inspector should advance hand auger borings or use a hand penetration device in the bases of the foundation excavations. The necessary depth of penetration will be established during the subgrade observations.

Based on the field testing procedures (SPT borings) the foundation bearing soils are expected to be stable when exposed. However, if pockets of unstable or unsuitable soils requiring undercut are encountered in the footing excavations, the proposed footing elevation should be re-established by means of backfilling with "flowable fill" or a suitable structural fill material compacted to a dry density of at least 98% of the Modified Proctor maximum dry density (ASTM Specification D 1557) prior to concrete placement.

Immediately prior to reinforcement placement, it is suggested that the bearing surfaces of all foundations be compacted using hand operated mechanical tampers. In this manner, any localized areas, which have been loosened by excavation operations, should be adequately recompacted. The compaction testing in the base of the foundation may be waived by the inspector, where firm bearing soils are observed during the foundation inspections.

Soils exposed in the bases of all satisfactory foundation excavations should be protected against any detrimental change in condition, such as physical disturbance, rain or frost. Surface run-off water should be drained away from the excavations and not be allowed to pond. If possible, all footing concrete should be placed the same day the excavation is made. If this is not possible, the footing excavations should be adequately protected.

#### **4.8 Pile Foundation Recommendations-Alternative II (Column Loads in Excess of 500 kips, Wall Loads in Excess of 12 klf)**

If the foundation loads are in excess of 500 kips (column) and/or 12 klf (walls), deep foundation support will likely be required for the buildings' framing. Following is a description of the pile capacity analyses and our recommendations for static axial compressive pile capacities. In addition, we have provided estimates of potential settlement.

##### **4.8.1 Axial Compression Capacity Recommendations - SPPC Piles**

It is our opinion that driven SPPC piles will be most economical of the driven pile options. The recommendations presented in this report are preliminary and deeper borings will be required to substantiate our findings. We conducted pile capacity analyses using static formulas with coefficients recommended by Geoffrey Myerhoff and George Sowers. The analyses include the contributions of shaft friction and end bearing to the pile capacity. The piles are expected to derive the majority of their capacity from shaft friction and end bearing in the expected deeper sand layer at the depth presented in the table on the following page.

The soil materials typically exhibit time-dependent strength characteristics; consequently shaft friction and end bearing support tend to increase from initial installation through a process termed "soil setup". Essentially, the dynamics of driving piles will cause excess pore pressures to develop, thereby decreasing driving resistance during initial pile installation. The pile capacities developed during driving are usually much lower than the design values. Once driving is complete, the excess pore pressures dissipate with time (and soil setup occurs) and the bearing capacity of the pile increases. Based upon our experience with similar projects in the area, 5 to 7 days is usually required for the full pore pressures to dissipation and soil setup to occur.

For the reasons previously described, it will not be possible to confirm pile capacities with a simple driving criterion such as number of hammer blows per foot of advanced pile. Instead, driving criteria will likely consist of a target tip elevation and/or certain embedded length in a bearing material with specified driving resistance. The specified driving resistance should be based on a Wave Equation Analysis of the contractor's selected hammer.

Table VI provides our recommended pile type and length for the structure's foundation. The estimated allowable capacities for the piles include a safety factor of at least 2.0 to allow for a pile load test program that relies primarily on dynamic testing. The capacity of a group of piles spaced at least 3 pile diameters apart, center to center, can be taken as the sum of the individual capacities with no reduction factor. If closer pile spacing is anticipated, the geotechnical engineer should be contacted to evaluate the efficiency of the specific pile group. The final order lengths and tip elevations will be adjusted based on the results of the test piles and load test programs.

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**Table VI - Pile Lengths and Capacities for 12" SPPC**

<b>Pile Type</b>	<b>Estimated Embedment Depth (ft)*</b>	<b>Estimated Allowable Compression Capacity (tons)</b>	<b>Estimated Allowable Tension Capacity (tons)</b>	<b>Estimated Allowable Lateral Capacity (tons)**</b>	<b>Pre-Augering Depth (ft)</b>
<b>Army AIT Barracks/Site A</b>					
12" SPPC	30 - 35	45 - 55	25	4	15
<b>Marine AIT Barracks/Site B</b>					
12" SPPC	65 - 70	65 - 75	30	4	15

\* Below existing site grades, shallower refusal depths are likely due to dense driving conditions. In some instances the piles may refuse as shallow as 34 to 50 feet due to very dense soil conditions.

\*\* Lateral capacity computed for a lateral load applied at the pile butt level (fixed condition), at ground level for a maximum butt deflection of ½-inch. Batter piles would enhance lateral capacity.

We recommend pre-augering the pile locations prior to driving to the depth shown in the table. This is necessary to help in minimizing the effects of vibrations from the driving effort on adjacent buildings, penetrate fill materials and to reduce the potential for pile breakage. Following the pre-augering, the piles should be installed and advanced by driving with an impact hammer to their design tip elevations. If for some reason during construction, pile driving "capacity" is encountered before the piles reach their design tip elevations, the Geotechnical Engineer should be retained to review driving records and field reports to determine whether the pile can adequately support the design loads. If the pile driving hammer is not properly matched to the pile type, size and subsurface conditions, it may reach practical refusal before the pile reaches the design tip elevation, or the required capacity.

#### **4.8.2 Pile Group Settlement**

Based on the results of load tests performed on piles driven in similar soils conditions, it is anticipated that the total butt settlements (including elastic shortening) will not exceed about ½-inch, which is the settlement necessary to mobilize the soil/pile capacity in combination with the pile group settlements due to the stress increase in the underlying soils.

#### **4.8.3 Additional Geotechnical Investigation**

An additional subsurface investigation is required for the purpose of substantiating pile capacities and embedment depth. A minimum of two (2) 60-foot deep SPT borings should be drilled at the Army AIT Barracks site and four (4) 80-foot deep SPT borings should be drilled at the Marine AIT Barracks site. This information should be used to finalize the pile design capacities.

## 4.9 Slab-on-Grade

The floor slabs may be constructed as slab-on-grade members provided the previously recommended earthwork activities and evaluations are carried out properly. It is recommended that all ground floor slabs be directly supported by at least a 4-inch layer of relatively clean, compacted, poorly graded sand (SP) or gravel (GP) with less than 5% passing the No. 200 Sieve (0.074 mm). The purpose of the 4-inch layer is to act as a capillary barrier and equalize moisture conditions beneath the slabs.

It is recommended that all ground floor slabs be "floating". That is, generally ground supported and not rigidly connected to walls or foundations. This is to minimize the possibility of cracking and displacement of the floor slabs because of differential movements between the slab and the foundation.

It is also recommended that the floor slab bearing soils be covered by a vapor barrier or retarder in order to minimize the potential for floor dampness, which can affect the performance of glued tile and carpet. Generally, use a vapor retarder for minimal vapor resistance protection below the slab on grade. When floor finishes, site conditions or other considerations require greater vapor resistance protection; consideration should be given to using a vapor barrier. Selection of a vapor retarder or barrier should be made by the architect based on project requirements.

## 4.10 Pavement Design

The CBR testing was in progress at the time of this reporting. However, based on the visual classification and our experience with similar soils, a design CBR value of 5 to 7 should be used in designing the pavement sections. Based on our experience with similar soil conditions, the following pavement sections are typically used in this area:

### **Flexible Pavement:**

#### **Light Duty**

SUBGRADE:	Stable, compacted to at least 95% of the standard Proctor maximum dry density, lined with Geotextile Fabric (Mirafi 500x or equivalent) and approved by the Geotechnical Engineer.
AGGREGATE BASE:	Minimum 8.0 inches of Aggregate Base Material meeting 21-A of 21-B gradation.
ASPHALT SURFACE:	Minimum 2.0 inches of Asphalt Concrete, SM-9.5A.

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### Heavy Duty

**SUBGRADE:** Stable, compacted to at least 95% of the standard Proctor maximum dry density, lined with Geotextile Fabric (Mirafi 500x or equivalent) and approved by the Geotechnical Engineer.

**AGGREGATE BASE:** Minimum 8.0 inches of Aggregate Base Material meeting 21-A of 21-B gradation.

**ASPHALT BASE:** Minimum 3.0 inches of Asphalt Concrete, BM-25.0.

**ASPHALT SURFACE:** Minimum 2.0 inches of Asphalt Concrete, SM-9.5A.

Actual pavement section thickness should be provided by the design civil engineer based on traffic loads, volume, and the owners design life requirements. The above sections correspond to thickness representative of typical local construction practices and as such periodic maintenance should be anticipated.

In preparation for a stable subgrade support for the pavement section, the following construction steps are recommended:

1. Following pavement rough grading operations, the exposed subgrade should be observed under proofrolling. This proofrolling should be accomplished with a fully loaded dump truck or 7 to 10 ton drum roller to check for pockets of soft material hidden beneath a thin crust of better soil. Any unsuitable materials thus exposed should be removed and replaced with a well-compacted material. The inspection of these phases should be performed by the Geotechnical Engineer or his representative. Based on our laboratory test results and our experience with similar subgrade soils, some subgrade improvements are anticipated and a contingency fund to handle undercutting and backfilling should be included in the budget (unit rates for undercut and backfill with compacted structural fill, compacted aggregate base and compacted base mix asphalt).

2. Where excessively unstable subgrade soils are observed during proofrolling and/or fill placement, it is expected that these weak areas can be stabilized by means of adding geotextile fabric and/or thickening the base course layer to 10 to 12 inches (i.e. placement of 2 to 4 inches of additional aggregate base over fabric). Another option consists of undercutting the unstable area 12 to 18 inches and backfilling with select fill. These alternates are to be addressed by the Geotechnical Engineer during construction, if necessary, who will recommend the most economical approach at the time.

#### **4.11 Seismic Evaluation**

Based on our experience with neighboring projects, the subject project sites can be considered as a Site Class "D", in accordance with Table 1615.1.1 of the 2006 International Building Code.

### **5.0 CONSTRUCTION CONSIDERATIONS**

#### **5.1 Drainage and Groundwater Concerns**

It is expected that dewatering may be required for excavations that extend near or below the existing groundwater table. Dewatering above the groundwater level could probably be accomplished by pumping from sumps. Dewatering at depths below the groundwater level may require well pointing.

It would be advantageous to construct all fills early in the construction. If this is not accomplished, disturbance of the existing site drainage could result in collection of surface water in some areas, thus rendering these areas wet and very loose. Temporary drainage ditches should be employed by the contractor to accentuate drainage during construction.

#### **5.2 Site Utility Installation**

The base of the utility trenches should be observed by a qualified inspector prior to the pipe and structure placement to verify the suitability of the bearing soils. Based on the results of our field exploration program it is expected that the utilities and structures located at depths greater than 18 feet below existing site grades will bear in the wet, cohesive/granular soils. In these instances the bearing soils will likely require some stabilization to provide suitable bedding. This stabilization is typically accomplished by providing additional VDOT No. 57 stone bedding (typically 12 to 24 inches). In addition, depending on the depth of the utility trench excavation, some means of dewatering may be required to facilitate the utility installation and associated backfilling.



Report of Subsurface Investigation & Geotechnical Engineering Services  
**Army and Marine AIT Barracks-PN 36113-Feasibility Study**  
Fort Lee, Virginia  
**GET** Project No: VB09-283G

November 19, 2009

The resulting excavations should be backfilled with structural fill, as described in Section 4.3 of this report. The subsurface soils encountered at the boring locations did not appear to meet the criteria recommended in this report for reuse as structural fill. As such, imported fill will be required to backfill all utility excavations within the pavement and building areas.

### 5.3 Excavations

In Federal Register, Volume 54, No. 209 (October, 1989), the United States Department of Labor, Occupational Safety and Health Administration (OSHA) amended its "Construction Standards for Excavations, 29 CFR, part 1926, Subpart P". This document was issued to better insure the safety of workmen entering trenches or excavations. It is mandated by this federal regulation that all excavations, whether they be utility trenches, basement excavation or footing excavations, be constructed in accordance with the new (OSHA) guidelines. It is our understanding that these regulations are being strictly enforced and if they are not closely followed, the owner and the contractor could be liable for substantial penalties.

The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. The contractor's responsible person, as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations.

We are providing this information solely as a service to our client. **G E T Solutions, Inc.** is not assuming responsibility for construction site safety or the contractor's activities; such responsibility is not being implied and should not be inferred.

### **6.0 REPORT LIMITATIONS**

The recommendations submitted are based on the available soil information obtained by **G E T Solutions, Inc.** and the information supplied by the client and their consultants for the proposed project. If there are any revisions to the plans for this project or if deviations from the subsurface conditions noted in this report are encountered during construction, **G E T Solutions, Inc.** should be notified immediately to determine if changes in the foundation recommendations are required. If **G E T Solutions, Inc.** is not retained to perform these functions, **G E T Solutions, Inc.** can not be responsible for the impact of those conditions on the geotechnical recommendations for the project.

The Geotechnical Engineer warrants that the findings, recommendations, specifications or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

Report of Subsurface Investigation &amp; Geotechnical Engineering Services

November 19, 2009

**Army and Marine AIT Barracks-PN 36113-Feasibility Study**

Fort Lee, Virginia

**GET** Project No: VB09-283G

After the plans and specifications are more complete the Geotechnical Engineer should be provided the opportunity to review the final design plans and specifications to assure our engineering recommendations have been properly incorporated into the design documents, in order that the earthwork and foundation recommendations may be properly interpreted and implemented. At that time, it may be necessary to submit supplementary recommendations. This report has been prepared for the exclusive use of the client and their consultants for the specific application to the Army and Marine AIT Barracks located in Fort Lee, Virginia.



## **APPENDICES**

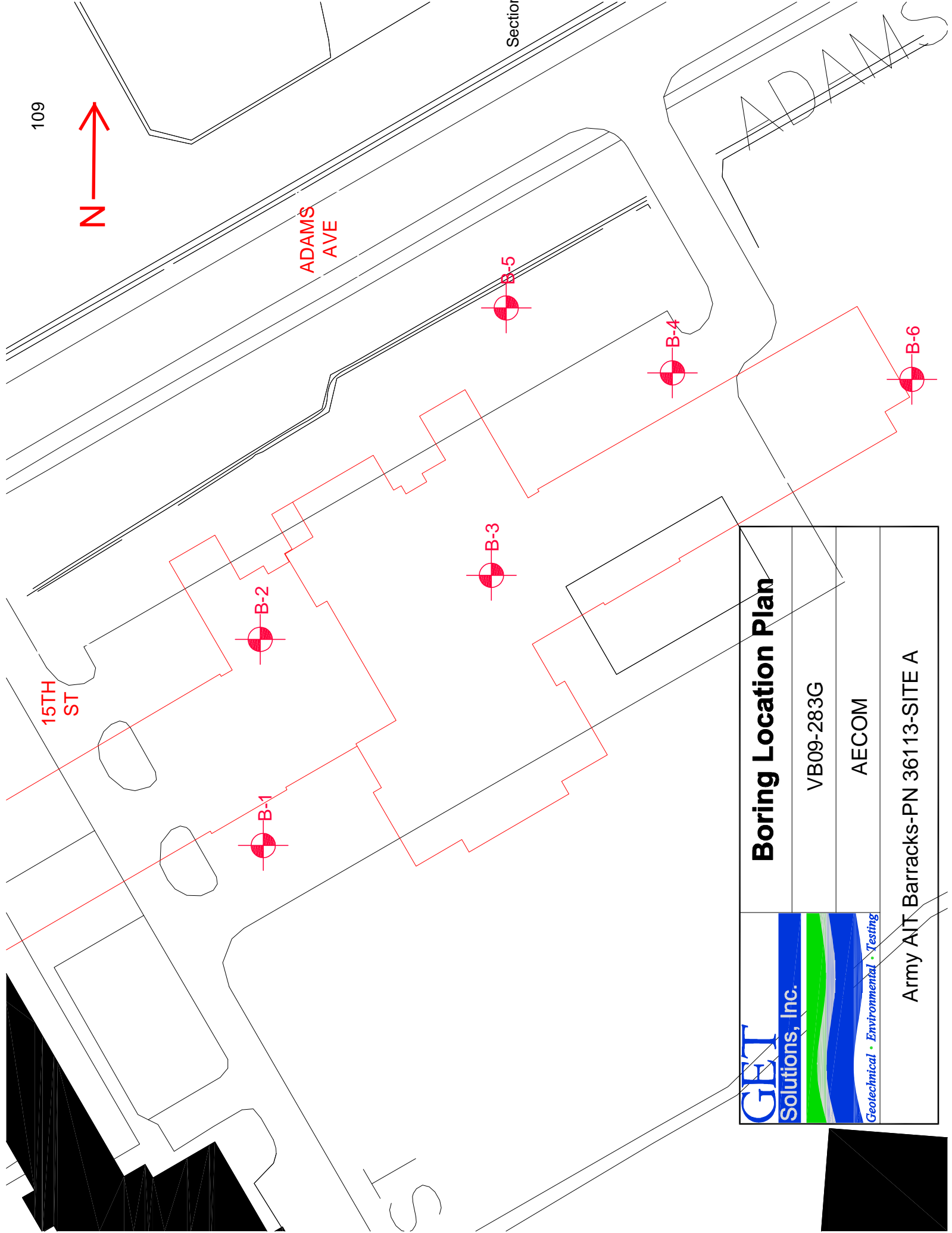
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- I BORING LOCATION PLAN
- II BORING LOGS
- III GENERALIZED SOIL PROFILE

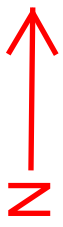
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**APPENDIX I**  
**BORING LOCATION PLAN**

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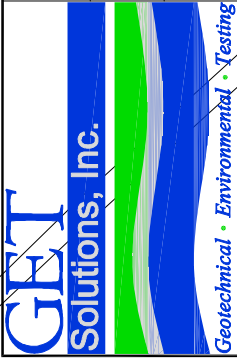


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ADAMS  
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Section:

 <b>GET</b> Solutions, Inc. <i>Geotechnical • Environmental • Testing</i>	<b>Boring Location Plan</b>	
	VB09-283G	
	AECOM	
Army AIT Barracks-PN 36113-SITE A		

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B-4

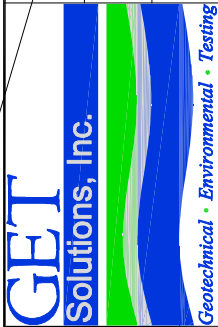
B-3

B-2

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B-6

 <b>GET</b> Solutions, Inc. <i>Geotechnical • Environmental • Testing</i>	<b>Boring Location Plan</b>	
	VB09-283G	AECOM
Marine AIT Barracks-PN 36113-Site B		

**APPENDIX II**  
BORING LOGS

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# BORING LOG B-1(A)

PROJECT: Army AIT Barracks-PN 36113/SITE A

W9126G-09-D-0046/47/48, RFP 0004

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CLIENT: AECOM

PROJECT LOCATION: Fort Lee, VA-Behind Commissary (BLDG. 1600)

PROJECT NO.: VB09-283G

BORING LOCATION: See attached boring location plan

SURFACE ELEVATION:

DRILLER: GET Solutions, Inc.

LOGGED BY: J. Robinson, E.I.T.

DRILLING METHOD: Rotary wash "mud"

DATE: 11-4-09

DEPTH TO WATER - INITIAL\*: 19' AFTER 24 HOURS: 19'

CAVING: C

Elevation (MSL) (ft)	Depth (meters)	Depth (feet)	Description	Graphic	Sample No.	Sample Recovery	Sample Type	Blows per 6"	N-Value	% < #200	TEST RESULTS	
											Plastic Limit	Liquid Limit
											Moisture Content -	
											N-Value -	
											10 20 30 40 50 60 70	
	0	0	3.25" Asphalt									
			2.75" Aggregate Base Material		1	14"	SS	2	4			
			Mottled Orange to Gray, Moist, fat CLAY (CH) with varying amounts of fine Sand, Soft to Very Stiff		2	24"	SS	3	10			
		5			3	21"	SS	4	20			
	2				4	12"	SS	5	25			
		10			5	24"	SS	6	22			
	4				6	20"	SS	7	13			
		15			7	22"	SS	8	15			
	6	20	Mottled Orange to Gray, Wet, Silty fine to coarse SAND (SM) with varying amounts of fine to coarse Gravel, Very Loose to Medium Dense		8	20"	SS	9	3			
		25			9	18"	SS	10	7			
	8				10	14"	SS	11	27			
		30			11	18"	SS	12	41			
	10		Mottled Orange to Gray, Wet, poorly graded fine to coarse GRAVEL (GP-SP) with Sand, Silt and Clay, Dense					13				
		35						14				
			Mottled Orange to Gray, Wet, Silty fine to coarse SAND (SM) with					15				
								16				
								17				
								18				
								19				
								20				
								21				
								22				
								23				
								24				
								25				
								26				

Notes: SITE A: Addition to the Existing AIT Barracks

SS = Split Spoon Sample  
ST = Shelby Tube Sample  
BS = Bulk Sample  
WOH = Weight of Hammer

Wednesday, November 4, 2010

\*The initial groundwater reading may not be indicative of the static groundwater level.



# BORING LOG B-1(A)

PROJECT: Army AIT Barracks-PN 36113/SITE A

W9126G-09-D-0046/47/48, RFP 0004

PROJECT NO.: VB09-283G

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CLIENT: AECOM

PROJECT LOCATION: Fort Lee, VA-Behind Commissary (BLDG. 1600)

LOCATION: See attached boring location plan

ELEVATION:

DRILLER: GET Solutions, Inc.

LOGGED BY: J. Robinson, E.I.T.

DRILLING METHOD: Rotary wash "mud"

DATE: 11-4-09

DEPTH TO - WATER&gt; INITIAL: 19'

AFTER 24 HOURS: 19'

CAVING&gt; C

Elevation (MSL) (ft)	Depth (meters)	Depth (feet)	Description	Graphic	Sample No.	Sample Recovery	Sample Type	Blows per 6"	N-Value	% < #200	TEST RESULTS	
											Plastic Limit	Liquid Limit
	12	40	Clay and fine to coarse Gravel, Medium Dense to Dense		12	14"	SS	15 15	41			
		45	Boring terminated at 50 ft.		13	18"	SS	5 6 19 17	25			
	14											
		50	Boring terminated at 50 ft.		14	24"	SS	13 14 15 18	29			
	16		Boring terminated at 50 ft.									
		55										
	18	60	Boring terminated at 50 ft.									
	20	65	Boring terminated at 50 ft.									
		70	Boring terminated at 50 ft.									
	22		Boring terminated at 50 ft.									
		75	Boring terminated at 50 ft.									

Notes: SITE A: Addition to the Existing AIT Barracks

SS = Split Spoon Sample  
ST = Shelby Tube Sample  
BS = Bulk Sample  
WOH = Weight of Hammer

Wednesday, November 4, 2010

\*The initial groundwater reading may not be indicative of the static groundwater level.



**PROJECT:** Army AIT Barracks-PN 36113/SITE A

W9126G-09-D-0046/47/48, RFP 0004

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**CLIENT:** AECOM

**PROJECT LOCATION:** Fort Lee, VA-Behind Commissary (BLDG. 1600)

**PROJECT NO.:** VB09-283G

**BORING LOCATION:** See attached boring location plan

**SURFACE ELEVATION:**

**DRILLER:** GET Solutions, Inc.

**LOGGED BY:** J. Robinson, E.I.T.

**DRILLING METHOD:** Rotary wash "mud"

DATE: 11-4-09

**DEPTH TO WATER - INITIAL\*:**  18' **AFTER 24 HOURS:** 

CAVING&gt; C

# BORING LOG

## B-2(A)

Elevation (MSL) (ft)	Depth (meters)	Depth (feet)	Description	Graphic	Sample No.	Sample Recovery	Sample Type	Blows per 6"	N-Value	% < #200
	0	0	4" Topsoil							
			Mottled Orange to Gray, Moist, fat CLAY (CH) with trace to little fine Sand and varying amounts of fibrous organics, Stiff to Very Stiff		1	19"	SS	2 3 6 8	9	
					2	20"	SS	7 9 10 8	19	
	5				3	20"	SS	5 8 11 9	19	
2					4	24"	SS	11 11 11 13	22	
			Mottled Orange to Gray, Moist, Silty fine to medium SAND (SM) with Clay, Medium Dense		5	24"	SS	11 10 14 16	24	
	10				6	24"	SS	13 13 15 15	28	
4			Mottled Orange to Gray, Moist, fat CLAY (CH) with trace fine Sand, Stiff		7	24"	SS	2 4 6 8	10	96
	15									
			Orange, Wet, poorly graded fine to coarse SAND (SP-SM) with Silt and trace fine Gravel, Very Loose to Loose		8	16"	SS	3 2 2 2	4	
6		20								
					9	18"	SS	3 3 3 5	6	11
8		25								
			Mottled Orange to Gray, Wet, Silty fine to coarse SAND (SM) with Clay, Medium Dense		10	16"	SS	11 15 13 16	28	
	30									
10			Mottled Orange to Gray, Wet, poorly graded fine to coarse GRAVEL (GP-SP) with Sand, Silt and Clay, Very Dense		11	4"	SS	62 63 -	63	
	35		Boring terminated at 35 ft.							

**Notes:** SITE A: Addition to the Existing AIT Barracks

SS = Split Spoon Sample  
ST = Shelby Tube Sample  
HA = Hand Auger Sample  
BS = Bulk Sample  
WOH = Weight of Hammer

ST = Shelby Tube Sample  
HA = Hand Auger Sample

*\*The initial groundwater reading may not be indicative of the static groundwater level.*



# BORING LOG B-3(A)

PROJECT: Army AIT Barracks-PN 36113/SITE A

W9126G-09-D-0046/47/48, RFP 0004

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CLIENT: AECOM

PROJECT LOCATION: Fort Lee, VA-Behind Commissary (BLDG. 1600)

PROJECT NO.: VB09-283G

BORING LOCATION: See attached boring location plan

SURFACE ELEVATION:

DRILLER: GET Solutions, Inc.

LOGGED BY: J. Robinson, E.I.T.

DRILLING METHOD: Rotary wash "mud"

DATE: 11-4-09

DEPTH TO WATER - INITIAL\*: 19' AFTER 24 HOURS: 19'

CAVING: C

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation (MSL) (ft)	Depth (meters)	Depth (feet)	Description	Graphic	Sample No.	Sample Recovery	Sample Type	Blows per 6"	N-Value	% < #200	TEST RESULTS	
											Plastic Limit	Liquid Limit
											Moisture Content - ●	
											N-Value -	
											10	20
											30	40
											50	60
											70	
	0	0	4.5" Asphalt									
			4.5" Aggregate Base Material		1	14"	SS	7 4 3	11			
			Mottled Orange to Gray, Moist, fat CLAY (CH) with trace to little fine Sand, Stiff to Very Stiff		2	22"	SS	3 4 6 5	10			
		5			3	24"	SS	5 5 5 6	10			
	2				4	20"	SS	5 7 8 9	15			
		10			5	24"	SS	10 11 12 13	23			
					6	24"	SS	2 5 7 10	12			
	4				7	24"	SS	2 4 6 6	10			
		15										
	6	20	Mottled Orange to Gray, Moist to Wet, Clayey fine to medium SAND (SC), Loose		8	14"	SS	1 2 4 3	6			
		25	Mottled Orange to Gray, Wet, poorly graded fine to coarse SAND (SP-SM) with Silt and trace fine Gravel, Loose to Very Dense		9	18"	SS	3 3 3 4	6			
	8											
		30			10	16"	SS	25 35 18 26	53			
	10											
		35	Mottled Orange to Gray, Wet, poorly graded fine to coarse GRAVEL (GP-SP) with Sand, Silt and Clay, Medium Dense		11	15"	SS	5 8 13 19	21			
			Boring terminated at 35 ft.									

Notes: SITE A: Addition to the Existing AIT Barracks

SS = Split Spoon Sample  
ST = Shelby Tube Sample  
BS = Bulk Sample  
WOH = Weight of Hammer

Wednesday, November 4, 2010

\*The initial groundwater reading may not be indicative of the static groundwater level.



# BORING LOG B-4(A)

PROJECT: Army AIT Barracks-PN 36113/SITE A

W9126G-09-D-0046/47/48, RFP 0004

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CLIENT: AECOM

PROJECT LOCATION: Fort Lee, VA-Behind Commissary (BLDG. 1600)

PROJECT NO.: VB09-283G

BORING LOCATION: See attached boring location plan

SURFACE ELEVATION:

DRILLER: GET Solutions, Inc.

LOGGED BY: J. Robinson, E.I.T.

DRILLING METHOD: Rotary wash "mud"

DATE: 11-4-09

DEPTH TO WATER - INITIAL\*: 22' AFTER 24 HOURS: 22'

CAVING&gt; C

Elevation (MSL) (ft)	Depth (meters)	Depth (feet)	Description	Graphic	Sample No.	Sample Recovery	Sample Type	Blows per 6"	N-Value	% < #200	TEST RESULTS	
											Plastic Limit	Liquid Limit
											Moisture Content -	
											N-Value -	
											10 20 30 40 50 60 70	
	0	0	4.25" Asphalt		1	12"	SS	3	5			
			3.75" Aggregate Base Material		2	24"	SS	4	12			
			Brown, Moist, Silty fine SAND (SM) with Clay and wood chips, Loose "FILL"		3	24"	SS	5	17			
	5		Mottled Orange to Gray, Moist, fat CLAY (CH) with trace to some fine Sand, Stiff to Very Stiff		4	24"	SS	6	27			
	2				5	24"	SS	10	30			
			Mottled Orange to Gray, Moist to Wet, Silty fine to coarse SAND (SM) with Clay and varying amounts of fine to medium Gravel, Loose to Very Dense		6	18"	SS	6	12			
					7	19"	SS	4	11			
	4				8	4"	SS	8	19			
					9	12"	SS	7	14			
	15				10	2"	SS	3	7			
					11	12"	SS	22	57			
	6	20						15				
								29				

Notes: SITE A: Addition to the Existing AIT Barracks

SS = Split Spoon Sample  
ST = Shelby Tube Sample  
BS = Bulk Sample  
WOH = Weight of Hammer

Wednesday, November 4, 2010

\*The initial groundwater reading may not be indicative of the static groundwater level.

W9126G-09-D-0046/47/48, RFP.0004

PROJECT NO.: VB09-283G

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**PROJECT LOCATION:** Fort Lee, VA-Behind Commissary (BLDG. 1600)

**LOCATION:** See attached boring location plan

ELEVATION:

**DRILLER:** GET Solutions, Inc.

**LOGGED BY:** J. Robinson, E.I.T.

**DRILLING METHOD:** Rotary wash "mud"

**DATE:** 11-4-09

**DEPTH TO - WATER> INITIAL:**  22' **AFTER 24 HOURS:** 

CAVING> C

# BORING LOG

## B-4(A)

[illegible]

**Notes:** SITE A: Addition to the Existing AIT Barracks

SS = Split Spoon Sample  
ST = Shelby Tube Sample  
HA = Hand Auger Sample  
BS = Bulk Sample  
WOH = Weight of Hammer

Wednesday, June 16, 2010

*\*The initial groundwater reading may not be indicative of the static groundwater level.*



# BORING LOG B-5(A)

PROJECT: Army AIT Barracks-PN 36113/SITE A

W9126G-09-D-0046/47/48, RFP 0004

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CLIENT: AECOM

PROJECT LOCATION: Fort Lee, VA-Behind Commissary (BLDG. 1600)

PROJECT NO.: VB09-283G

BORING LOCATION: See attached boring location plan

SURFACE ELEVATION:

DRILLER: GET Solutions, Inc.

LOGGED BY: J. Robinson, E.I.T.

DRILLING METHOD: Rotary wash "mud"

DATE: 11-5-09

DEPTH TO WATER - INITIAL\*:  $\nabla$  N/A AFTER 24 HOURS:  $\nabla$ 

CAVING&gt; C

Elevation (MSL) (ft)	Depth (meters)	Depth (feet)	Description	Graphic	Sample No.	Sample Recovery	Sample Type	Blows per 6"	N-Value	% < #200	TEST RESULTS	
											Plastic Limit	Liquid Limit
	0	0	6" Topsoil									
			Mottled Orange to Gray, Moist, fat CLAY (CH) with trace to little fine Sand, Medium Stiff to Very Stiff		1	20"	SS	2 3 5 4	8			
					2	14"	SS	2 5 8 10	13			
	5				3	22"	SS	7 9 8 11	17			
2					4	19"	SS	11 7 10 12	17			
					5	24"	SS	13 12 14 14	26			
	10		Mottled Orange to Gray, Moist, Clayey fine to medium SAND (SC), Medium Dense		6	22"	SS	15 14 14 15	28			
4												
			Mottled Orange to Gray, Moist, lean CLAY (CL) with little fine Sand, Very Stiff		7	24"	SS	13 10 11 9	21			
	15		Boring terminated at 15 ft.									
	6	20										
	25											
8												
	30											
10												
	35											

Notes: SITE A: Addition to the Existing AIT Barracks

SS = Split Spoon Sample  
ST = Shelby Tube Sample  
BS = Bulk Sample  
WOH = Weight of Hammer

Wednesday, November 11, 2010

\*The initial groundwater reading may not be indicative of the static groundwater level.





# BORING LOG B-6(A)

PROJECT: Army AIT Barracks-PN 36113/SITE A

W9126G-09-D-0046/47/48, RFP 0004

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CLIENT: AECOM

PROJECT LOCATION: Fort Lee, VA-Behind Commissary (BLDG. 1600)

PROJECT NO.: VB09-283G

BORING LOCATION: See attached boring location plan

SURFACE ELEVATION:

DRILLER: GET Solutions, Inc.

LOGGED BY: J. Robinson, E.I.T.

DRILLING METHOD: Rotary wash "mud"

DATE: 11-5-09

DEPTH TO WATER - INITIAL\*:  $\nabla$  N/A AFTER 24 HOURS:  $\nabla$ 

CAVING&gt; C

Elevation (MSL) (ft)	Depth (meters)	Depth (feet)	Description	Graphic	Sample No.	Sample Recovery	Sample Type	Blows per 6"	N-Value	% < #200	TEST RESULTS	
											Plastic Limit	Liquid Limit
	0	0	6" Topsoil					2				
			Mottled Orange to Gray, Moist, fat CLAY (CH) with trace to little fine Sand, Soft to Very Stiff		1	20"	SS	1 2 4	3			
					2	20"	SS	7 9 12 13	21			
	5				3	24"	SS	13 14 15 14	29			
	2		Mottled Orange to Gray, Moist, Clayey fine to medium SAND (SC), Medium Dense		4	16"	SS	10 12 12 13	24			
			Mottled Orange to Gray, Moist, Silty fine to medium SAND (SM) with Clay, Medium Dense		5	24"	SS	12 13 13 12	26			
	10				6	16"	SS	10 12 11 14	23			
	4				7	24"	SS	8 11 9 9	20			
	15		Boring terminated at 15 ft.									
	6	20										
		25										
	8											
		30										
	10											
		35										

Notes: SITE A: Addition to the Existing AIT Barracks

SS = Split Spoon Sample  
ST = Shelby Tube Sample  
BS = Bulk Sample  
WOH = Weight of Hammer

Wednesday, November 11, 2010

\*The initial groundwater reading may not be indicative of the static groundwater level.





# BORING LOG B-1(B)

PROJECT: Marine AIT Barracks-PN 36113/Site B

W9126G-09-D-0046/47/48, RFP 0004

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CLIENT: AECOM

PROJECT LOCATION: Fort Lee, VA-Located between Bldg. 6240 &amp; 6241 PROJECT NO.: VB09-283G

BORING LOCATION: See attached boring location plan

SURFACE ELEVATION:

DRILLER: GET Solutions, Inc.

LOGGED BY: J. Robinson, E.I.T.

DRILLING METHOD: Rotary wash "mud"

DATE: 11-5-09

DEPTH TO WATER - INITIAL\*: 18' AFTER 24 HOURS: 18'

CAVING: C

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation (MSL) (ft)	Depth (meters)	Depth (feet)	Description	Graphic	Sample No.	Sample Recovery	Sample Type	Blows per 6"	N-Value	% < #200	TEST RESULTS	
											Plastic Limit	Liquid Limit
	0	0	6" Topsoil									
		0.5	Brown, Moist, Silty fine SAND (SM) with trace fine Gravel and trace fibrous organics, Medium Dense "FILL"		1	18"	SS	3 6 11 10	17			
		2	Mottled Orange to Gray, Moist, fat CLAY (CH) with trace to little fine Sand, Very Stiff		2	10"	SS	8 7 10 11	17			
	5				3	20"	SS	10 11 9 10	20			
	2				4	10"	SS	6 7 11 11	18			
		8	Mottled Orange to Gray, Moist, Silty fine to medium SAND (SM) with trace Clay, Medium Dense		5	24"	SS	12 15 14 16	29			
	10		Mottled Orange to Gray, Moist, lean CLAY (CL) with trace to little fine Sand, Very Stiff		6	18"	SS	11 10 13 12	23			
	4		Mottled Orange to Gray, Moist, Silty fine to medium SAND (SM) with Clay and trace fine Gravel, Medium Dense		7	18"	SS	3 6 6 7	12			
	15											
		18	Mottled Orange to Gray, Wet, poorly graded fine to coarse SAND (SP-SM) with Silt and fine to medium Gravel, Medium Dense		8	14"	SS	10 9 10 12	19			
	6	20										
		23	Mottled Orange to Gray, Wet, Silty fine to coarse SAND (SM) with trace Clay, Loose		9	21"	SS	2 4 2 4	6			
	8	25										
					10	19"	SS	4 3 2 5	5			
	30											
	10		Bluish Gray, Wet, fat CLAY (CH) with trace fine Sand, Soft		11	24"	SS	1 1 2 1	3	93		
	35		Boring terminated at 35 ft.									

Notes: SITE B: New AIT Barracks Complex

SS = Split Spoon Sample  
ST = Shelby Tube Sample  
BS = Bulk Sample  
WOH = Weight of Hammer

Wednesday, November 4, 2010

\*The initial groundwater reading may not be indicative of the static groundwater level.



# BORING LOG B-2(B)

PROJECT: Marine AIT Barracks-PN 36113/Site B

W9126G-09-D-0046/47/48, RFP 0004

Page 244 of 469

CLIENT: AECOM

PROJECT LOCATION: Fort Lee, VA-Located between Bldg. 6240 &amp; 6241

PROJECT NO.: VB09-283G

BORING LOCATION: See attached boring location plan

SURFACE ELEVATION:

DRILLER: GET Solutions, Inc.

LOGGED BY: J. Robinson, E.I.T.

DRILLING METHOD: Rotary wash "mud"

DATE: 11-5-09

DEPTH TO WATER - INITIAL\*: 18' AFTER 24 HOURS: 18'

CAVING: C

Elevation (MSL) (ft)	Depth (meters)	Depth (feet)	Description	Graphic	Sample No.	Sample Recovery	Sample Type	Blows per 6"	N-Value	% < #200	TEST RESULTS	
											Plastic Limit	Liquid Limit
											Moisture Content - ●	
											N-Value -	
	0	0	5" Topsoil					3				
			Mottled Orange to Gray, Moist, fat CLAY (CH) with varying amounts of fine Sand, Medium Stiff to Hard		1	19"	SS	3	5			
					2	24"	SS	12	26			
		5			3	22"	SS	13	36			
	2				4	22"	SS	26	43			
			Mottled Orange to Gray, Moist to Wet, Silty fine to medium SAND (SM) with varying amounts of Clay and fine Gravel, Medium Dense to Dense		5	18"	SS	15	32			
		10			6	24"	SS	15	25			
	4				7	24"	SS	4	18			
		15			8	16"	SS	6	12			
	6	20			9	12"	SS	3	17			
		25			10	24"	SS	WOH	0			
	8				11	24"	SS	WOH	2			
		30	Bluish Gray, Wet, fat CLAY (CH) with trace fine Sand, Very Soft to Soft					WOH				
	10	35						WOH				
								WOH	97			

Notes: SITE B: New AIT Barracks Complex

SS = Split Spoon Sample  
ST = Shelby Tube Sample  
BS = Bulk Sample  
WOH = Weight of Hammer

Wednesday, November 4, 2010

\*The initial groundwater reading may not be indicative of the static groundwater level.

W9126G-09-D-0046/47/48, RFP 0004

6G-09-D-0046/47/48, RFP 0004

Page 245 of 469

**PROJECT LOCATION:** Fort Lee, VA-Located between Bldg. 6240 & 6241

**LOCATION:** See attached boring location plan

ELEVATION:

**DRILLER:** GET Solutions, Inc.

**LOGGED BY:** J. Robinson, E.I.T.

**DRILLING METHOD:** Rotary wash "mud"

**DATE:** 11-5-09

**DEPTH TO - WATER> INITIAL:**  18' **AFTER 24 HOURS:** 

CAVING> C

# BORING LOG

## B-2(B)

[illegible]

SS = Split Spoon Sample  
ST = Shelby Tube Sample  
HA = Hand Auger Sample  
BS = Bulk Sample  
WOH = Weight of Hammer

Wednesday, June 16, 2010

*\*The initial groundwater reading may not be indicative of the static groundwater level.*

PAGE 2 of 2

*Standard Penetration Tests were performed in the field in general accordance with ASTM D 1586.*

**This information pertains only to this boring and should not be interpreted as being indicative of the site.**



# BORING LOG B-3(B)

PROJECT: Marine AIT Barracks-PN 36113/Site B

W9126G-09-D-0046/47/48, RFP 0004

Page 246 of 469

CLIENT: AECOM

PROJECT LOCATION: Fort Lee, VA-Located between Bldg. 6240 &amp; 6241 PROJECT NO.: VB09-283G

BORING LOCATION: See attached boring location plan

SURFACE ELEVATION: \_\_\_\_\_

DRILLER: GET Solutions, Inc.

LOGGED BY: J. Robinson, E.I.T.

DRILLING METHOD: Rotary wash "mud"

DATE: 11-5-09

DEPTH TO WATER - INITIAL\*: 18' AFTER 24 HOURS: \_\_\_\_\_

CAVING: C

Elevation (MSL) (ft)	Depth (meters)	Depth (feet)	Description	Graphic	Sample No.	Sample Recovery	Sample Type	Blows per 6"	N-Value	% < #200	TEST RESULTS	
											Plastic Limit	Liquid Limit
											Moisture Content - ●	
											N-Value -	
											10 20 30 40 50 60 70	
	0	0	4" Topsoil		1	18"	SS	2 3 4 5	7			
			Mottled Orange to Gray, Moist, fine Sandy lean CLAY (CL), Medium Stiff "FILL"		2	24"	SS	7 9 11 14	20			
			Mottled Orange to Gray, Moist, fat CLAY (CH) with trace fine Sand, Very Stiff		3	16"	SS	10 11 12 10	23			
	2		Mottled Orange to Gray, Moist to Wet, Silty fine to coarse SAND (SM) with varying amounts of Clay, Loose to Medium Dense		4	22"	SS	7 9 10 11	19			
					5	20"	SS	6 8 8 9	16			
					6	24"	SS	7 7 8 7	15			
					7	16"	SS	5 6 5 6	11			
					8	14"	SS	4 6 4 4	10			
					9	24"	SS	3 4 7 6	11			
			Orange/Brown, Wet, lean CLAY (CL) with trace fine Sand, Stiff		10	24"	SS	WOH WOH WOH 2	96			
			Bluish Gray, Wet, fat CLAY (CH) with trace fine Sand, Very Soft		11	24"	SS	1 1 1 3	2			
			Boring terminated at 35 ft.									

Notes: SITE B: New AIT Barracks Complex

SS = Split Spoon Sample  
ST = Shelby Tube Sample  
BS = Bulk Sample  
WOH = Weight of Hammer

Wednesday, November 11, 2009

\*The initial groundwater reading may not be indicative of the static groundwater level.



# BORING LOG B-4(B)

PROJECT: Marine AIT Barracks-PN 36113/Site B

W9126G-09-D-0046/47/48, RFP 0004

Page 247 of 469

CLIENT: AECOM

PROJECT LOCATION: Fort Lee, VA-Located between Bldg. 6240 &amp; 6241 PROJECT NO.: VB09-283G

BORING LOCATION: See attached boring location plan

SURFACE ELEVATION:

DRILLER: GET Solutions, Inc.

LOGGED BY: J. Robinson, E.I.T.

DRILLING METHOD: Rotary wash "mud"

DATE: 11-6-09

DEPTH TO WATER - INITIAL\*: 18' AFTER 24 HOURS: 18'

CAVING: C

Elevation (MSL) (ft)	Depth (meters)	Depth (feet)	Description	Graphic	Sample No.	Sample Recovery	Sample Type	Blows per 6"	N-Value	% < #200	TEST RESULTS	
											Plastic Limit	Liquid Limit
											Moisture Content -	
											N-Value -	
											10 20 30 40 50 60 70	
	0	0	3" Topsoil					4				
			Brown, Moist, Silty fine to medium SAND (SM) with Clay and trace fine Gravel, Loose "FILL"		1	12"	SS	4	9			
			Orange, Moist, Clayey fine to medium SAND (SC) with trace fine Gravel, Loose "FILL"		2	24"	SS	3	7			
			Mottled Orange to Gray, Moist, at CLAY (CH) with trace to little fine Sand, Very Stiff to Hard		3	23"	SS	5	16			
	2				4	24"	SS	15	36			
					5	24"	SS	16	37			
					6	24"	SS	17	36			
					7	18"	SS	18	30			
			Mottled Orange to Gray, Moist to Wet, Silty fine to medium SAND (SM) with varying amounts of Clay, Loose to Medium Dense		8	18"	SS	19	13			
					9	20"	SS	20	10			
					10	24"	SS	21	8			
					11	24"	SS	22	7			
								23	5			
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								100				

Notes: SITE B: New AIT Barracks Complex

SS = Split Spoon Sample  
ST = Shelby Tube Sample  
BS = Bulk Sample  
WOH = Weight of Hammer

Wednesday, November 11, 2009

\*The initial groundwater reading may not be indicative of the static groundwater level.



# BORING LOG B-4(B)

PROJECT: Marine AIT Barracks-PN 36113/Site B

W9126G-09-D-0046/47/48, RFP 0004

PROJECT NO.: VB09-283G

Page 248 of 469

CLIENT: AECOM

PROJECT LOCATION: Fort Lee, VA-Located between Bldg. 6240 &amp; 6241

LOCATION: See attached boring location plan

ELEVATION:

DRILLER: GET Solutions, Inc.

LOGGED BY: J. Robinson, E.I.T.

DRILLING METHOD: Rotary wash "mud"

DATE: 11-6-09

DEPTH TO - WATER&gt; INITIAL: 18'

AFTER 24 HOURS: 18'

CAVING&gt; C

Elevation (MSL) (ft)	Depth (meters)	Depth (feet)	Description	Graphic	Sample No.	Sample Recovery	Sample Type	Blows per 6"	N-Value	% < #200	TEST RESULTS	
											Plastic Limit	Liquid Limit
											Moisture Content -	
											N-Value -	
											10 20 30 40 50 60 70	
	12				12	14"	SS	3 4	6			
		40	Mottled Orange to Gray, Wet, fat CLAY (CH) with trace fine Sand, Stiff									
					13	14"	SS	2 5 5 4	10			
	14	45										
					14	24"	SS	1 2 3 5	5			
		48	Bluish Gray, Wet, lean CLAY (CL) with trace fine Sand, Medium Stiff									
		50	Boring terminated at 50 ft.									
	16											
		55										
	18	60										
	20	65										
		70										
	22											
		75										

Notes: SITE B: New AIT Barracks Complex

SS = Split Spoon Sample  
ST = Shelby Tube Sample  
BS = Bulk Sample  
WOH = Weight of Hammer

Wednesday, November 11, 2010

\*The initial groundwater reading may not be indicative of the static groundwater level.



# **BORING LOG B-5(B)**

PROJECT: Marine AIT Barracks-PN 36113/Site B

W9126G-09-D-0046/47/48, RFP 0004

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CLIENT: AECOM

PROJECT LOCATION: Fort Lee, VA-Located between Bldg. 6240 &amp; 6241

PROJECT NO.: VB09-283G

BORING LOCATION: See attached boring location plan

SURFACE ELEVATION:

DRILLER: GET Solutions, Inc.

LOGGED BY: J. Robinson, E.I.T.

DRILLING METHOD: Rotary wash "mud"

DATE: 11-5-09

DEPTH TO WATER - INITIAL\*:  $\nabla$  N/A AFTER 24 HOURS:  $\nabla$ 

CAVING&gt; C

Elevation (MSL) (ft)	Depth (meters)	Depth (feet)	Description	Graphic	Sample No.	Sample Recovery	Sample Type	Blows per 6"	N-Value	% < #200	TEST RESULTS	
											Plastic Limit	Liquid Limit
	0	0	5" Topsoil					2				
			Mottled Orange to Gray, Moist, fat CLAY (CL) with trace to little fine Sand, Medium Stiff to Very Stiff		1	22"	SS	2 2 3 4	5			
					2	19"	SS	5 8 13 14	21			
	5				3	24"	SS	13 15 15 16	30			
	2				4	22"	SS	14 17 12 13	29			
					5	24"	SS	11 12 13 11	25			
	10		Orange/Tan, Moist, Silty fine to medium SAND (SM) with varying amounts of Clay, Medium Dense		6	20"	SS	12 11 12 10	23			
	4				7	24"	SS	8 8 6 7	14			
	15		Boring terminated at 15 ft.									
	6	20										
	25											
	8											
	30											
	10											
	35											

Notes: SITE B: New AIT Barracks Complex

SS = Split Spoon Sample  
ST = Shelby Tube Sample  
BS = Bulk Sample  
WOH = Weight of Hammer

Wednesday, November 4, 2010

\*The initial groundwater reading may not be indicative of the static groundwater level.





# **BORING LOG** **B-6(B)**

PROJECT: Marine AIT Barracks-PN 36113/Site B

W9126G-09-D-0046/47/48, RFP 0004

Page 250 of 469

CLIENT: AECOM

PROJECT LOCATION: Fort Lee, VA-Located between Bldg. 6240 &amp; 6241 PROJECT NO.: VB09-283G

BORING LOCATION: See attached boring location plan

SURFACE ELEVATION:

DRILLER: GET Solutions, Inc.

LOGGED BY: J. Robinson, E.I.T.

DRILLING METHOD: Rotary wash "mud"

DATE: 11-6-09

DEPTH TO WATER - INITIAL\*:  $\nabla$  N/A AFTER 24 HOURS:  $\nabla$ CAVING:  $\nabla$ 

Elevation (MSL) (ft)	Depth (meters)	Depth (feet)	Description	Graphic	Sample No.	Sample Recovery	Sample Type	Blows per 6"	N-Value	% < #200	TEST RESULTS	
											Plastic Limit	Liquid Limit
	0	0	6" Asphalt		1	10"	SS	3				
			3" Aggregate Base Material									
			Mottled Orange to Gray, Moist, fat CLAY (CH) with trace to little fine Sand, Soft to Very Stiff		2	24"	SS	13				
	5				3	22"	SS	22				
2					4	20"	SS	22				
			Mottled Orange to Gray, Moist, Silty fine to medium SAND (SM) with Clay, Dense		5	24"	SS	31				
10			Orange, Moist, Clayey fine to medium SAND (SC), Medium Dense		6	20"	SS	25				
4			Mottled Orange to Gray, Moist, Silty fine to coarse SAND (SM) with fine to medium Gravel, Medium Dense		7	24"	SS	27				
15			Boring terminated at 15 ft.									
6		20										
		25										
8												
		30										
10												
		35										

Notes: SITE B: New AIT Barracks Complex

SS = Split Spoon Sample  
ST = Shelby Tube Sample  
BS = Bulk Sample  
WOH = Weight of Hammer

Wednesday, November 11, 2010

\*The initial groundwater reading may not be indicative of the static groundwater level.













# KEY TO SYMBOLS


## Strata symbols



Drill rejection

	Paving
	Aggregate Base Material
	Fat Clay
	Silty Sand
	Poorly graded Gravel and Sand
	Topsoil
	Poorly graded Sand with Silt
	Clayey Sand
	Fill
	Lean Clay

## Misc. Symbols

	Water table during drilling
---	--------------------------------

## Notes:

1. Exploratory borings were drilled on 11-5-09 using a 4-inch diameter continuous flight power auger.
2. No free water was encountered at the time of drilling or when re-checked the following day.
3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.

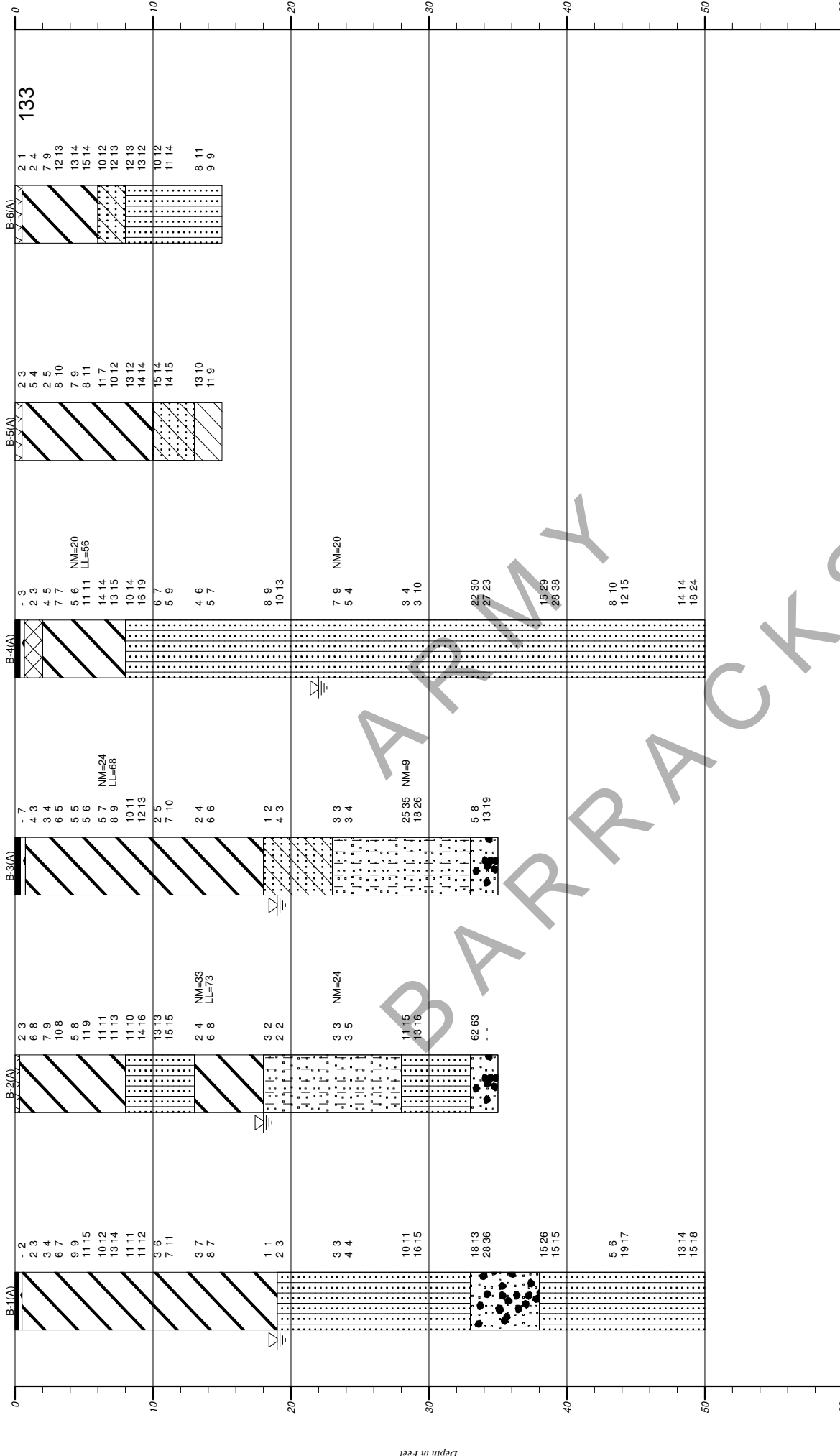
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### **APPENDIX III**

#### **GENERALIZED SOIL PROFILE**

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Section: APPENDIX A



Wednesday, June 16, 2010

- Topsoil
- Poorly graded Sand with Silt
- Clayey Sand
- Fill
- Lean Clay

- Aggregate Base Material
- Silty Sand
- Poorly graded Gravel and Sand

GET Solutions, Inc.

GENERALIZED SOIL PROFILE

HORIZONTAL SCALE: 1"=10'

VERTICAL SCALE: 1"=10'

DRAWN BY/DATE: 11/19/2009

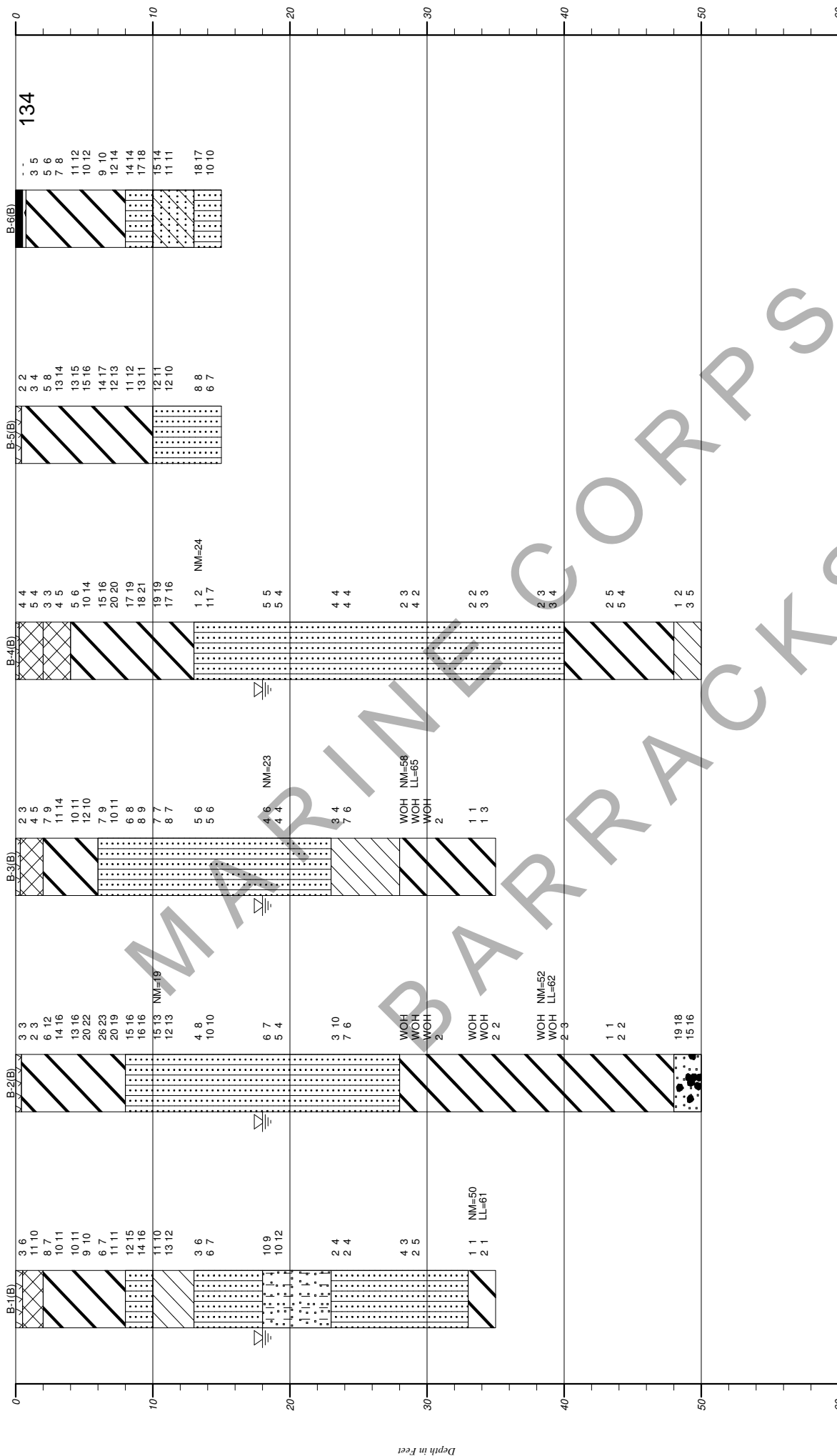
APPROVED BY: 11/19/2009

Army AIT Barracks-PN 36113/SITE A

PROJECT NO. VB09-283G

FIGURE NUMBER

## Section: APPENDIX A



Wednesday, June 16, 2010

Wednesday, June 16, 2010

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GET Solutions, Inc.

# GENERALIZED SOIL PROFILE

**DRAWN BY/APPROVED BY**

NAME

	=10'	MM
--	------	----

Marine AIT Barracks-PN 361

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December 22, 2009

TO: **AECOM**448 Viking Drive, Suite 145  
Virginia Beach, VA 23452

Attn: Mr. Paul T. Garrison, PE, CEM, LEED AP

RE: Addendum No. 1

Report of Subsurface Exploration and Geotechnical Engineering Services  
**Army and Marine AIT Barracks-PN 36113-Feasibility Study**  
Fort Lee, Virginia  
G E T Project No: VB09-283G

Dear Mr. Garrison:

The following is an addendum to our report of subsurface exploration and geotechnical engineering services (VB09-283G) submitted November 19, 2009 for the above referenced project. The purpose of this addendum is to provide the now completed laboratory data (CBR Test Results) and the consolidation test results.

### **Pavement Design**

The California Bearing Ratio (CBR) test results indicated an average soaked CBR value of 5.5. The average soaked CBR value was multiplied by a factor of two-thirds to determine a pavement design CBR value. The two-thirds factor provides the necessary safety margins to compensate for some non-uniformity of the soil. Therefore, a CBR value of 3.7 should be used in designing the pavement sections. A summary of the CBR test results and the moisture density relationship curves (Proctor) are attached.

The mentioned CBR test results are slightly lower than the values presented in our original Geotechnical Report (design CBR value of 5 to 7). Nevertheless, the typical pavement sections and construction recommendations presented in the original Geotechnical Report remain valid.

Actual pavement section thickness should be provided by the design civil engineer based on traffic loads, volume, and the owners design life requirements. The pavement sections provided in the original report correspond to thickness representative of typical local construction practices and as such periodic maintenance should be anticipated.

Addendum No. 1

December 22, 2009

Report of Subsurface Exploration and Geotechnical Engineering Services

**Army and Marine AIT Barracks-PN 36113-Feasibility Study**

Fort Lee, Virginia

G E T Project No: VB09-283G

## Consolidation Testing

One (1) one-dimensional consolidation test was performed on the specimen from the Shelby tube sample obtained at the location of boring B-2(B), drilled within the Marine AIT Barracks-Site B, at depths ranging from 33 to 35 feet below the existing site grade. The consolidation test was performed at our Virginia Beach laboratory in general accordance with ASTM D 2435. A representative specimen from the Shelby tube was also subjected to natural moisture content, Atterberg Limits, and -#200 sieve testing. A summary of the consolidation test results for boring B-2(B) is provided in the table below and the comprehensive results are attached to this letter.

Boring No.	Depth (ft)	Natural Moisture (%)	Overburden Pressure (tsf)	Pre-Consolidation Pressure $P_c$ (tsf)	$C_c$	$C_r$	$e_o$
B-2(B)	34.5	51	1.4	3.18	0.70	0.05	1.377

## Settlement Discussion

The consolidation testing was performed on the Weight-of-Hammer CLAY (CH) recovered at a depth of 34.5 feet below grades in order to calculate the settlement induced by the structural loads on this soil layer. The Log of boring B-2(B) is attached to this letter. The magnitude and duration of the settlement associated with these loading conditions is important to planning the construction. We evaluated settlement at the point of maximum loading conditions.

We selected the maximum floor loading of 150 psf (estimated based on our experience), column loads of 435 kips and wall loads 10 klf (provided by AECOM's Structural Department) along with a maximum fill height of 2 feet and evaluated them with the appropriate subsurface information from the consolidation testing performed at boring location B-2(B). The magnitude and duration of the settlement at locations with smaller loads are expected to be less than the values calculated for these locations. The subsurface soil parameters used during our analysis of this section were estimated by using the SPT boring data, the results of laboratory classification and consolidation testing.



Addendum No. 1

December 22, 2009

Report of Subsurface Exploration and Geotechnical Engineering Services

**Army and Marine AIT Barracks-PN 36113-Feasibility Study**

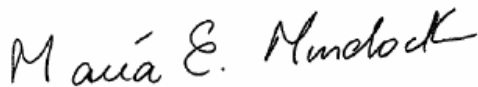
Fort Lee, Virginia

G E T Project No: VB09-283G

Based on our analysis, a total settlement magnitude of about 0.5 inches is expected to occur within the subsurface soils as a result of the structural loads and fill required to achieve the design grade elevations. The majority of the calculated settlement will be a result of the consolidation settlements associated within the very soft to soft CLAY (CH) soils encountered between the depths of about 28 to 48 feet below existing site grades at the location of boring B-2(B). These CLAY soils were determined to be over-consolidated with an OCR (over consolidation ratio) of 2.3. The stress increase plus the overburden pressure within the CLAY layer was less than the pre-consolidation pressure. Consequently, the cohesive soils were loaded in the over-consolidated or pre-consolidated compression range and the estimated primary settlement magnitudes are expected to be relatively small. As such, the Shallow Foundation Settlement Recommendations (Section 4.6) of the original geotechnical report remain valid.

Thank you for the opportunity to work with you on this project. We trust that the information contained herein meets your immediate need, and should you have any questions or if we could be of further assistance, please do not hesitate to contact us.

Respectfully Submitted,

**G E T Solutions, Inc.**

Maria E. Murdock, P.E.  
Project Engineer  
VA Lic. #039988



D. Mark Schofield, P.E.  
Senior Geotechnical Engineer  
VA Lic. # 33932



Attachments: Summary of CBR Test Results

Moisture Density Test Reports (Proctor Curves)

CBR Curves (Load vs. Penetration)

Consolidation Test Results and Time-Rate Curves

Log of Boring B-2(B)

Copies: (1) Client

Wednesday, June 16, 2010

## **SUMMARY OF CBR TEST RESULTS**

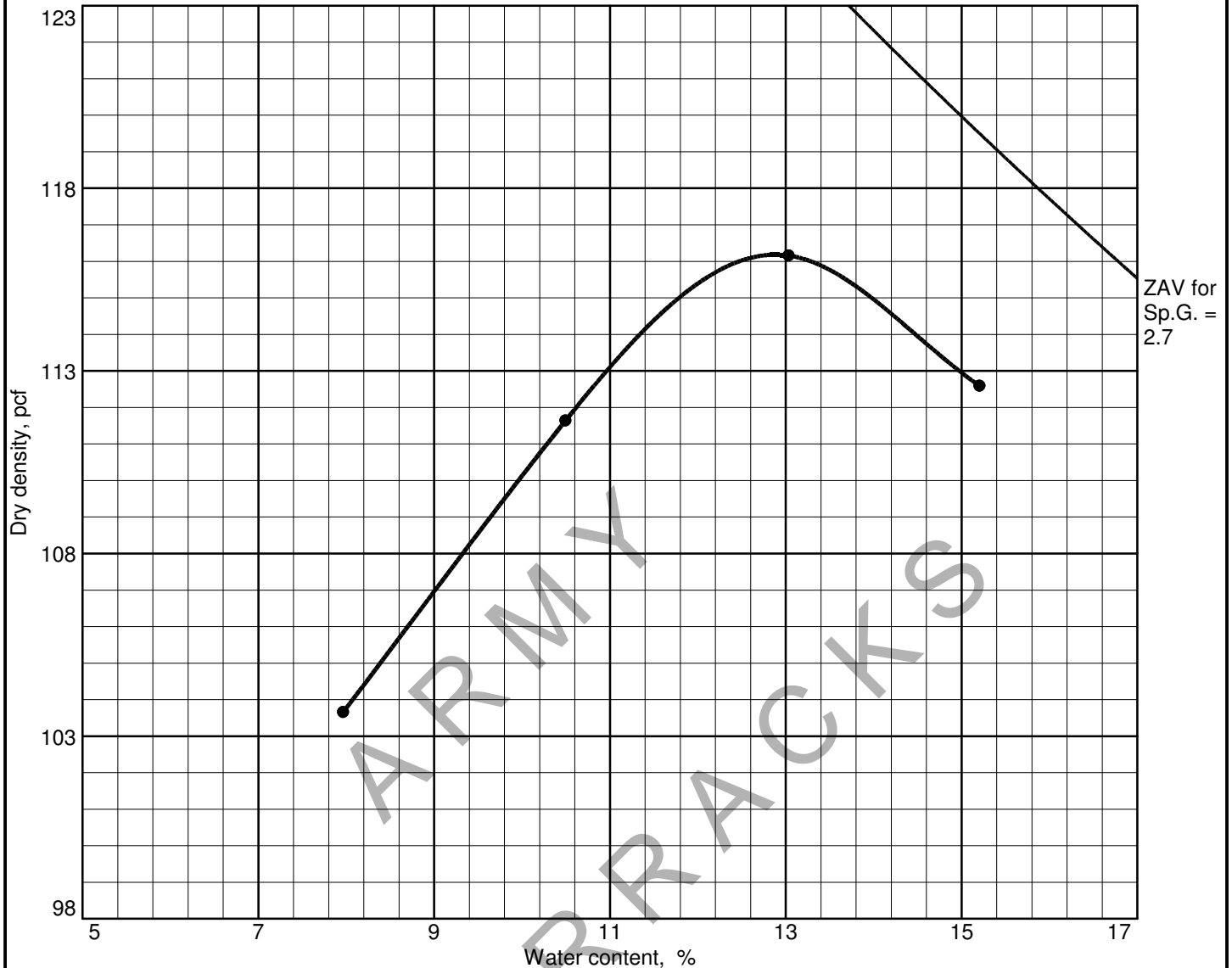
**SUMMARY OF CBR TEST RESULTS**

<b>Sample Number</b>	<b>CBR-5(A)</b>	<b>CBR-6(A)</b>	<b>CBR-6(B)</b>
<b>Site</b>	Army AIT Barracks-Site A	Army AIT Barracks-Site A	Marine AIT Barracks-Site B
<b>Sample Depth (ft.)</b>	0.5-2	0.5-2	0.75-2
<b>Unified Soil Classification Symbol</b>	CL	CL	CH
<b>Natural Moisture Content (%)</b>	15	13	22
<b>Atterberg Limits LL/PL/PI</b>	43/17/26	48/20/28	69/30/39
<b>% Passing #200 Sieve</b>	66	62	72
<b>Maximum Dry Density, pcf</b>	116.2	117.5	102.5
<b>Optimum Moisture %</b>	12.9	12.7	21.2
<b>Soaked CBR Value</b>	7.6	3.3	5.7
<b>Resiliency Factor</b>	2.0	2.0	2.0

**Army and Marine AIT Barracks-PN 36113**  
**Sites A and B**  
**Feasibility Study**  
Fort Lee, Virginia  
**G E T** Project No: VB09-283G

**MOISTURE DENSITY TEST REPORT  
(PROCTOR CURVES)**

# MOISTURE DENSITY RELATIONSHIP (PROCTOR CURVE)



Test specification: ASTM D 698-00a Method A Standard

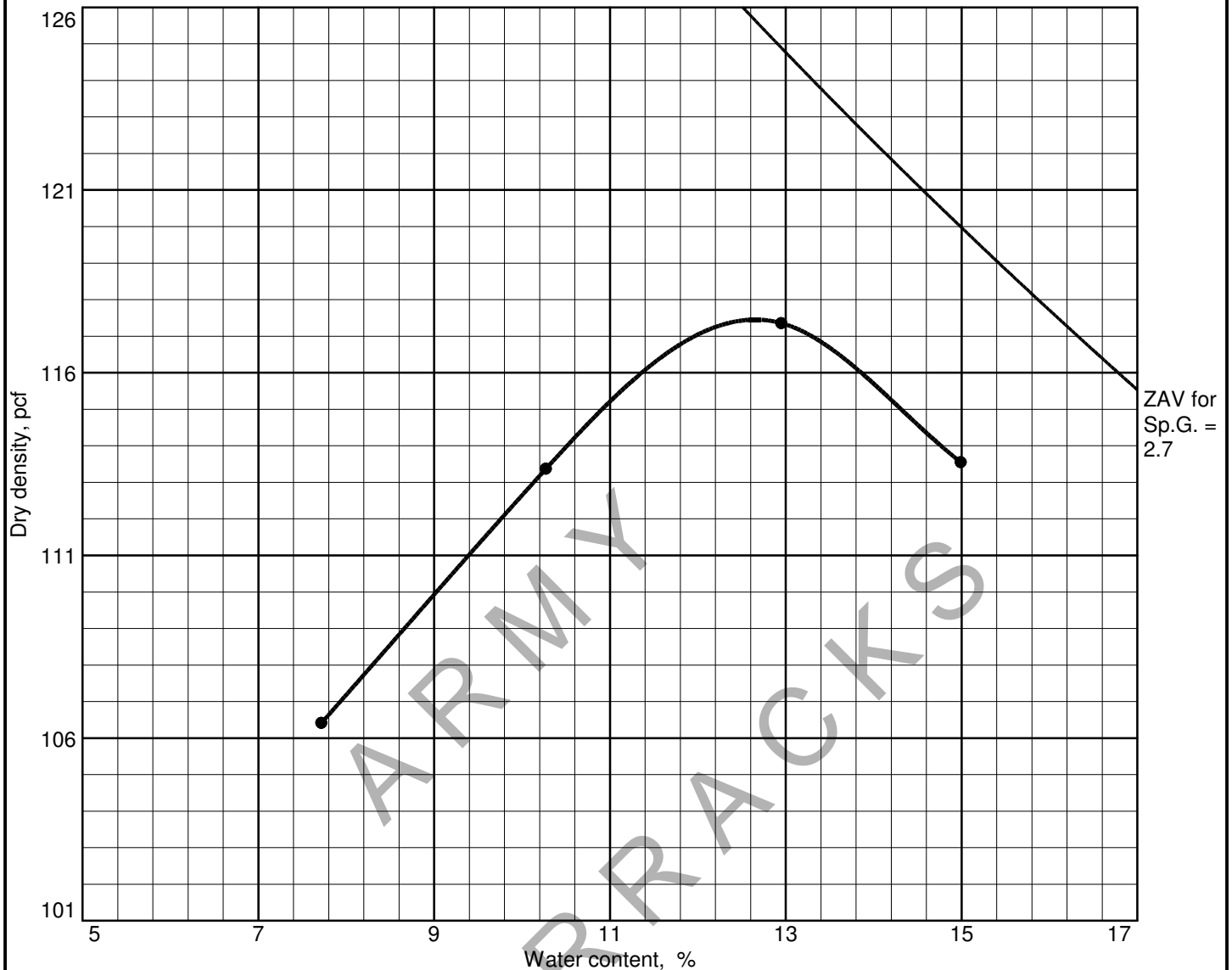
Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
0.5-2 ft.	CL	A-7-6(15)	15		43	26	0.0	66

TEST RESULTS		MATERIAL DESCRIPTION	
Maximum dry density = 116.2 pcf		Tan, Sandy Lean CLAY	
Optimum moisture = 12.9 %			
<b>Project No.</b> VB09-283G <b>Client:</b> AECOM <b>Project:</b> Army AIT Barracks-PN 36113/SITE A  ● <b>Location:</b> B-5(A) (See Plans)		<b>Remarks:</b> CBR-5(A) Sample Obtained 11/5/09 Soaked CBR Value=7.6 Resiliency Factor=2.0	
MOISTURE DENSITY RELATIONSHIP (PROCTOR CURVE)  <b>GET SOLUTIONS, INC.</b>			
		Figure 1	

Figure 1

Wednesday, June 16, 2010

# MOISTURE DENSITY RELATIONSHIP (PROCTOR CURVE)



Test specification: ASTM D 698-00a Method A Standard

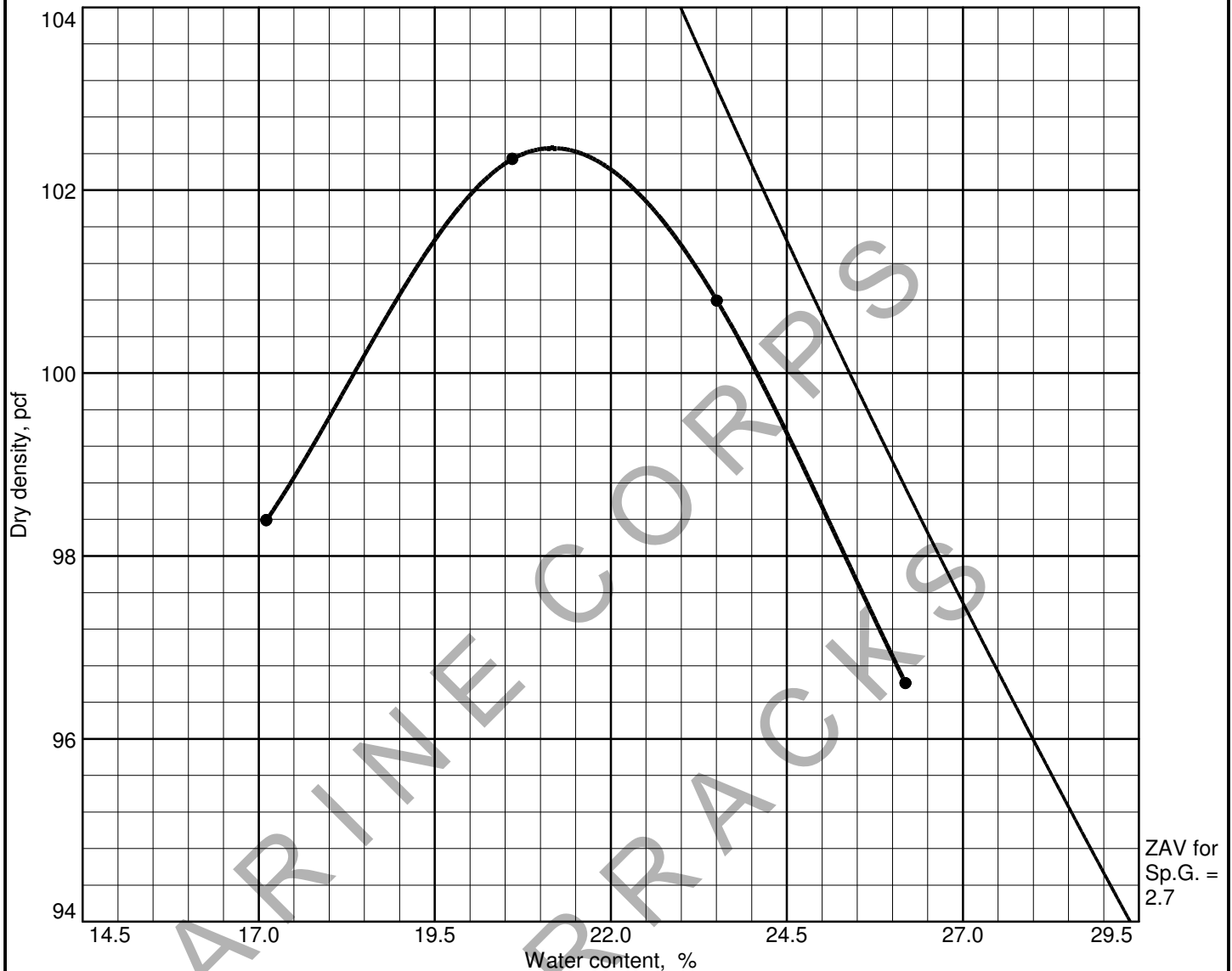
Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
0.5-2 ft.	CL	A-7-6(15)	13		48	28	0.0	62

TEST RESULTS		MATERIAL DESCRIPTION	
Maximum dry density = 117.5 pcf		Tan, Sandy Lean CLAY	
Optimum moisture = 12.7 %			
<b>Project No.</b> VB09-283G <b>Client:</b> AECOM <b>Project:</b> Army AIT Barracks-PN 36113/SITE A  ● <b>Location:</b> B-6(A) (See Plans)		<b>Remarks:</b> CBR-6(A) Sample Obtained 11/5/09 Soaked CBR Value=3.3 Resiliency Factor=2.0	
MOISTURE DENSITY RELATIONSHIP (PROCTOR CURVE)  <b>GET SOLUTIONS, INC.</b>			
		<b>Figure</b> 2	

Figure 2

Wednesday, June 16, 2010

# MOISTURE DENSITY RELATIONSHIP (PROCTOR CURVE)



Test specification: ASTM D 698-00a Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
0.75-2 ft.	CH	A-7-5(29)	22		69	39	2.0	72

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 102.5 pcf  Optimum moisture = 21.2 %	Reddish Brown, Fat CLAY with Sand
<b>Project No.</b> VB09-283G <b>Client:</b> AECOM <b>Project:</b> Marine AIT Barracks-PN 36113/Site B  ● <b>Location:</b> B-6(B) Site B (See Plans)	<b>Remarks:</b> CBR-6(B) Sample Obtained 11/6/09 Soaked CBR Value=5.7 Resiliency Factor=2.0
MOISTURE DENSITY RELATIONSHIP (PROCTOR CURVE)  <b>GET SOLUTIONS, INC.</b>	<b>Figure</b> 1

Figure 1

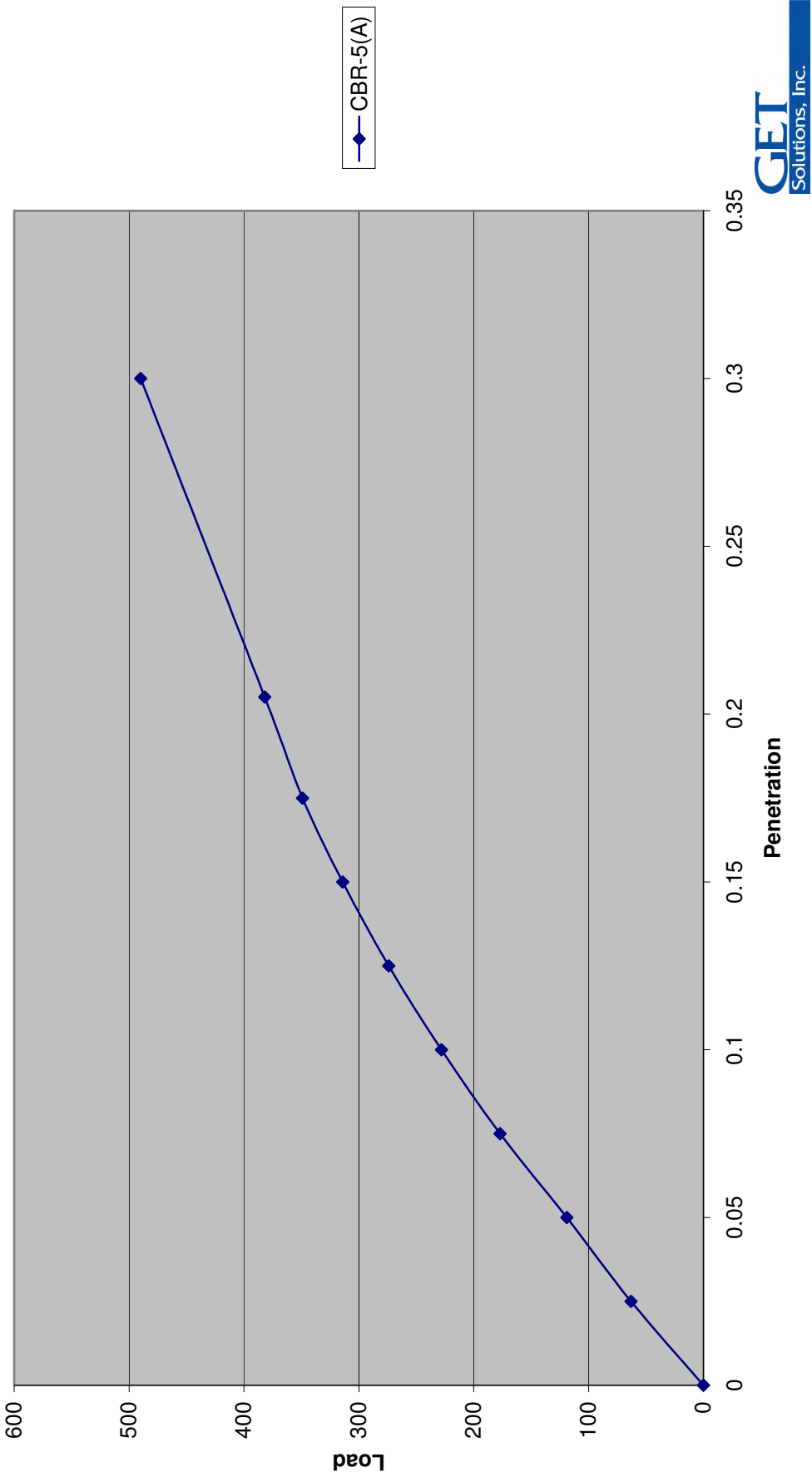
Wednesday, June 16, 2010

**CBR CURVES**  
**(Load vs. Penetration)**



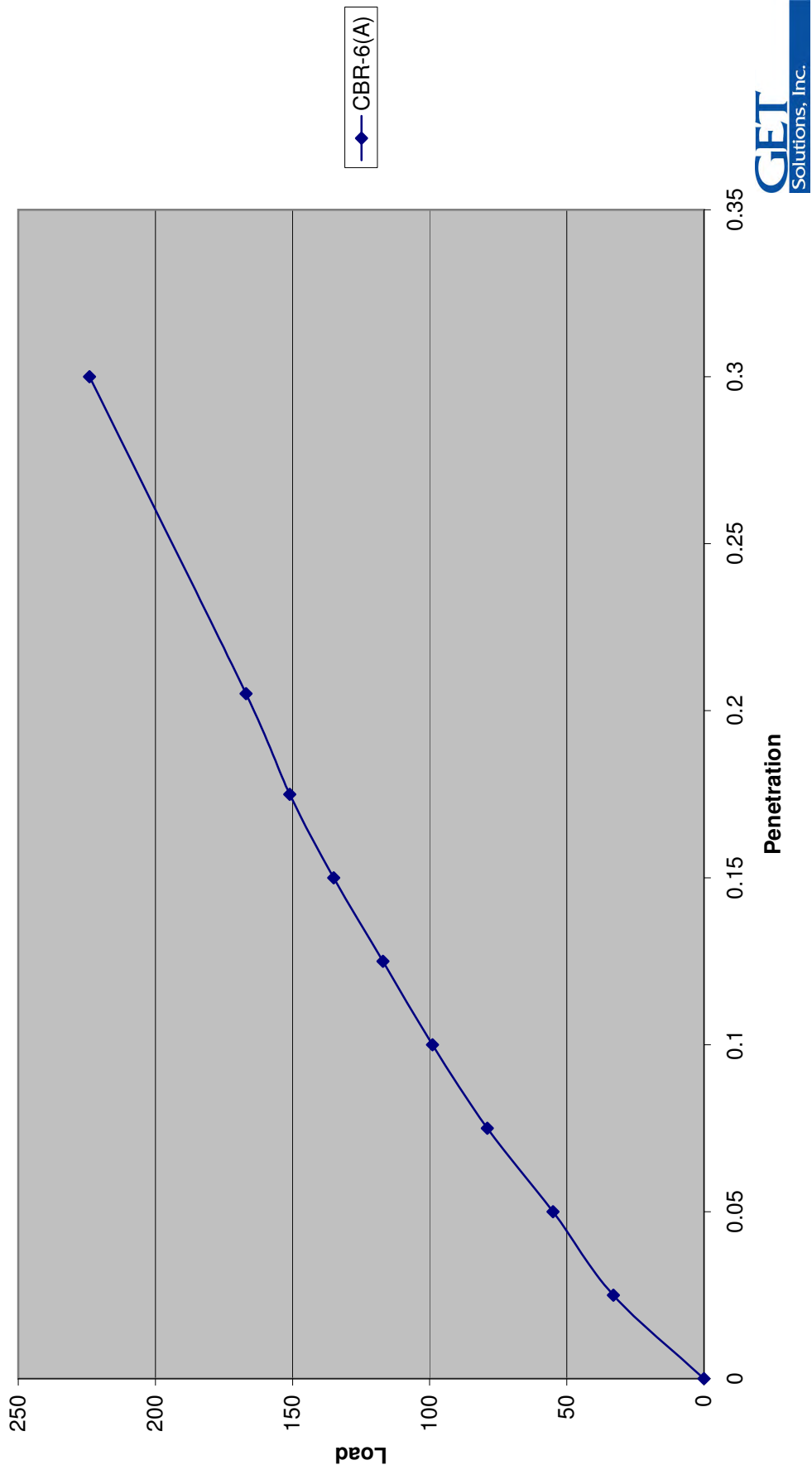
# ARMY BARRACKS

CBR Curve  
Ft. Lee Army AIT Barracks  
PN 36113/Site A  
GET Project # VB09-283G



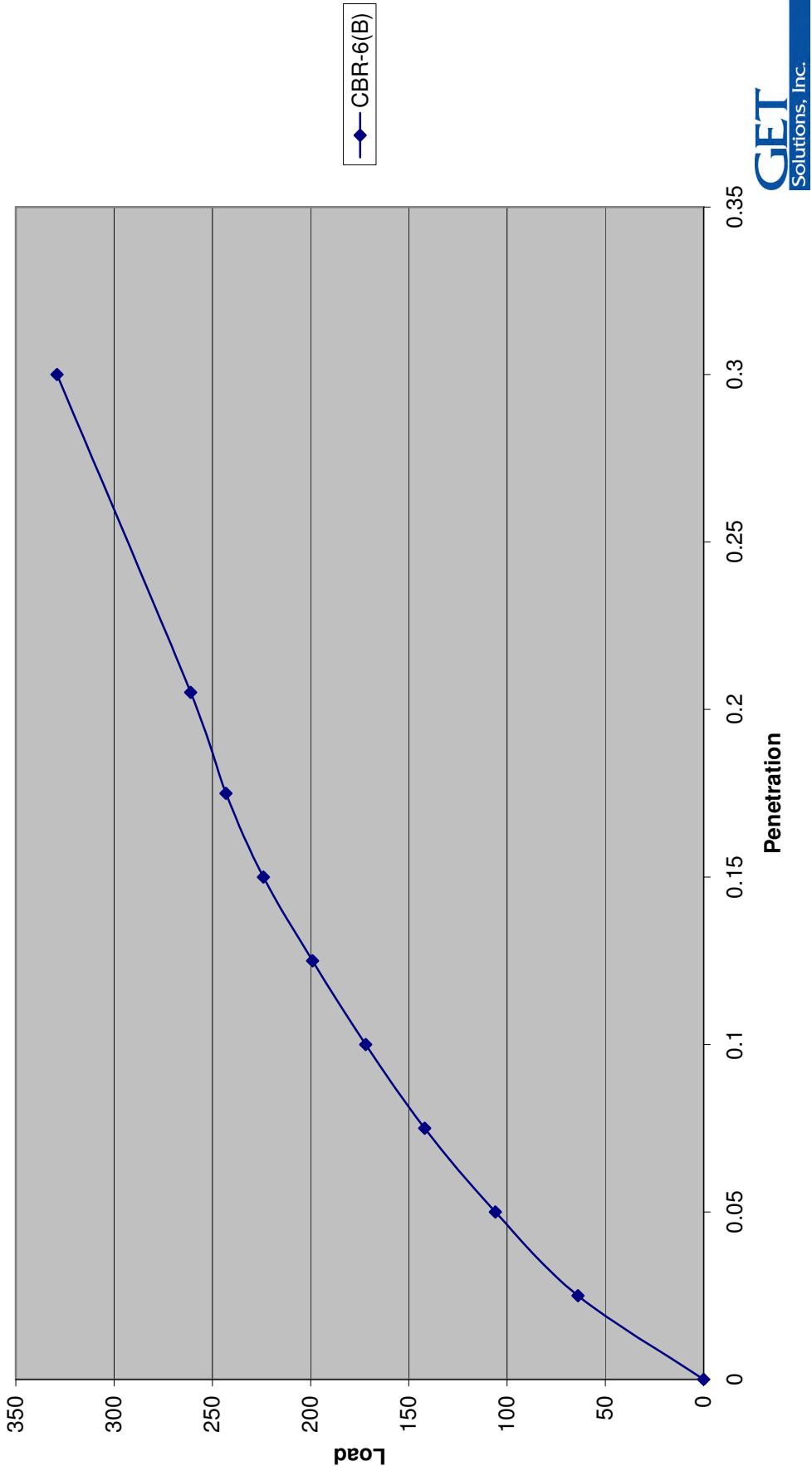
# ARMY BARRACKS

CBR Curve  
Ft. Lee Army AIT Barracks  
PN 36113/Site A  
GET Project # VB09-283G



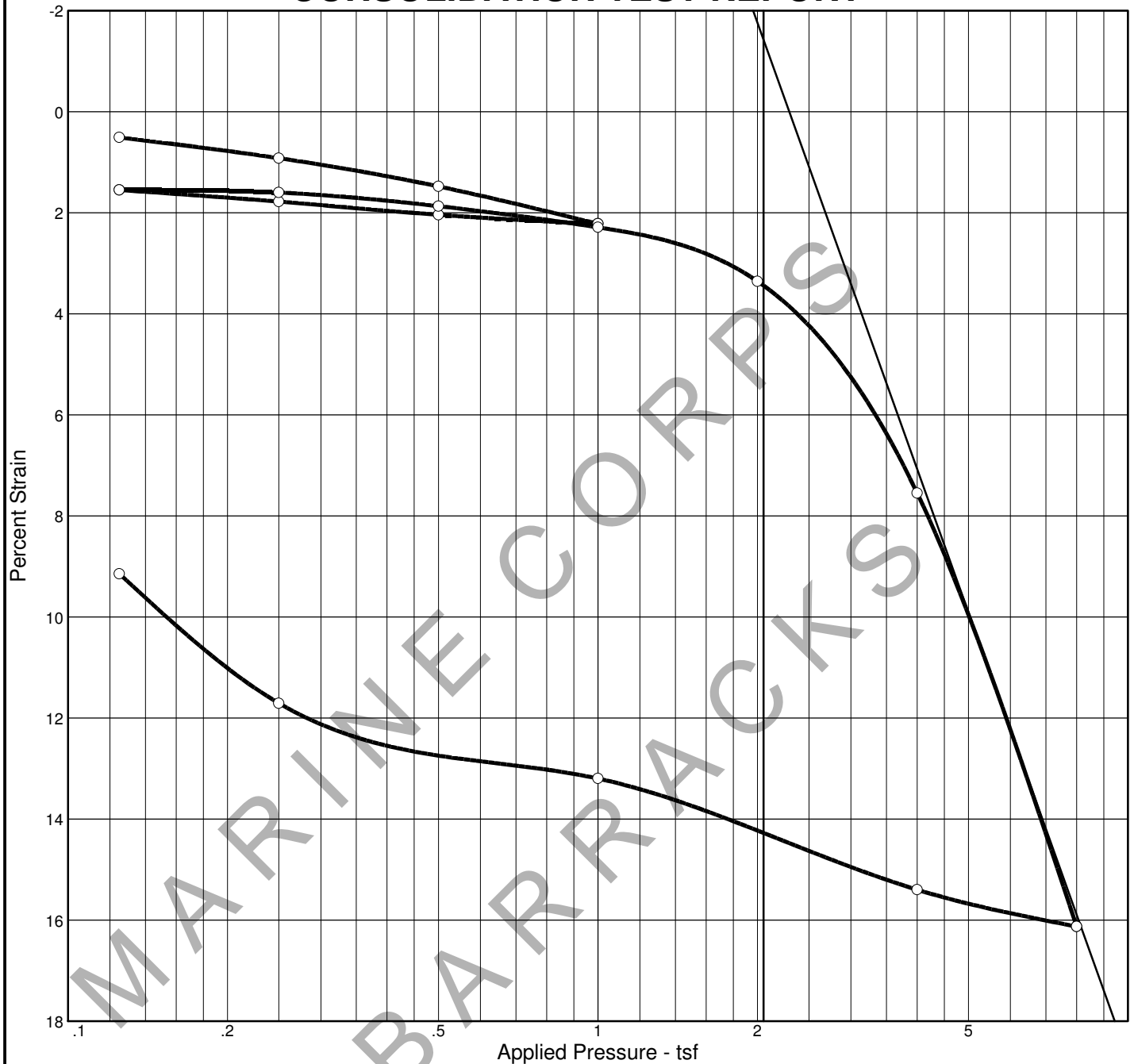
MARINE CORPS BARRACKS

CBR Curve  
Ft. Lee Marine AIT Barracks  
PN 36113/Site B  
GET Project # VB09-283G



## **CONSOLIDATION TEST RESULTS AND TIME-RATE CURVES**

# CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	$P_c$ (tsf)	$C_c$	$C_r$	Swell Press. (tsf)	Swell %	$e_0$
Sat.	Moist.											
100.0 %	50.8 %	71.2	56	35	2.71	1.40	3.18	0.70	0.05			1.377

MATERIAL DESCRIPTION										USCS	AASHTO
Gray, Fat CLAY										CH	A-7-6(39)

**Project No.** VB09-283G **Client:** AECOM

**Project:** Marine AIT Barracks-PN 36113/Site B

**Location:** B-2(B) (See Plans)

## Remarks:

B-2(B)  
Sample Obtained 11/16/09  
Depth=34.5 ft.  
% Passing #200 sieve=99

CONSOLIDATION TEST REPORT

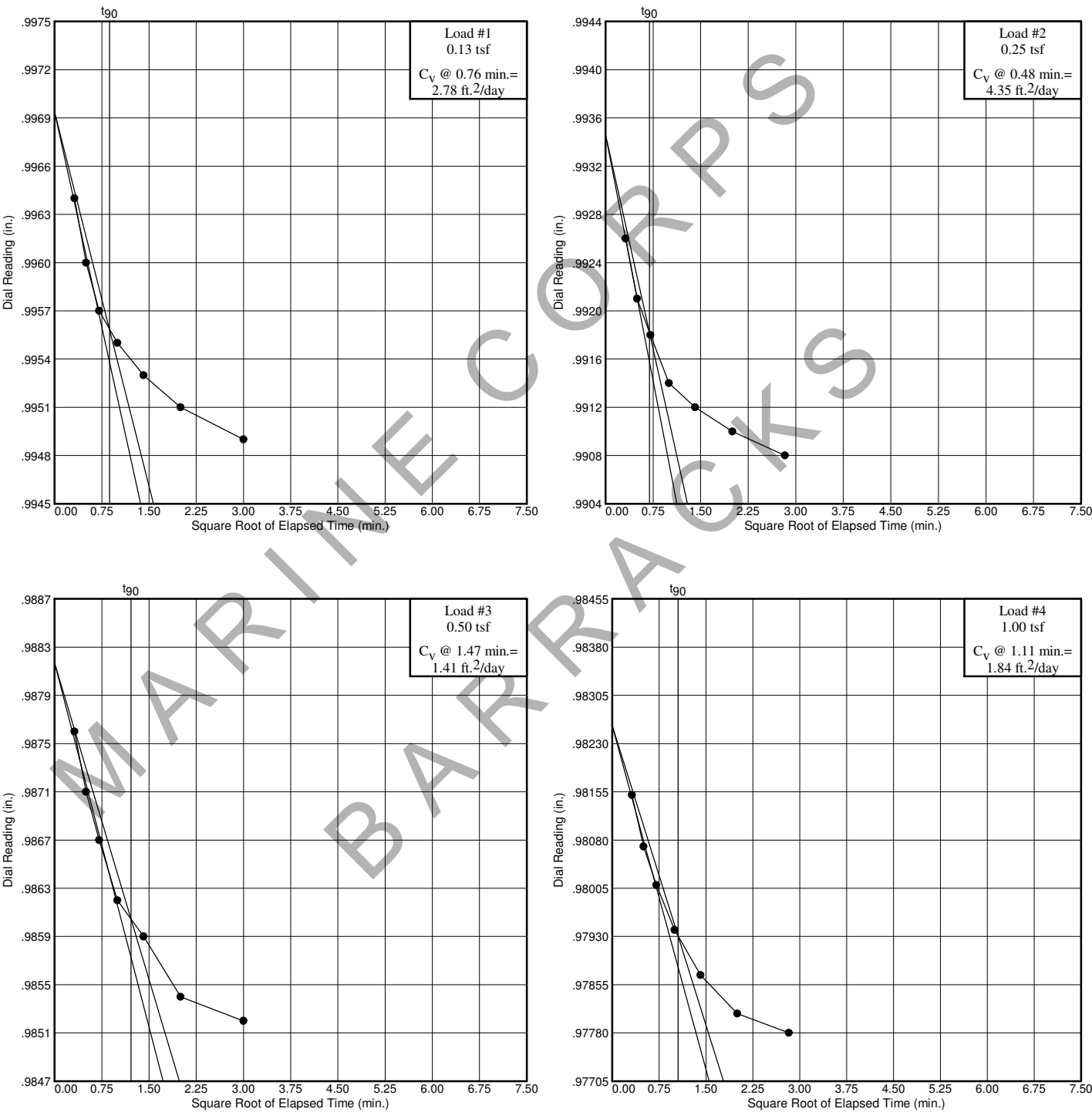
**GET SOLUTIONS, INC.**

**Figure 1**

Wednesday, June 16, 2010

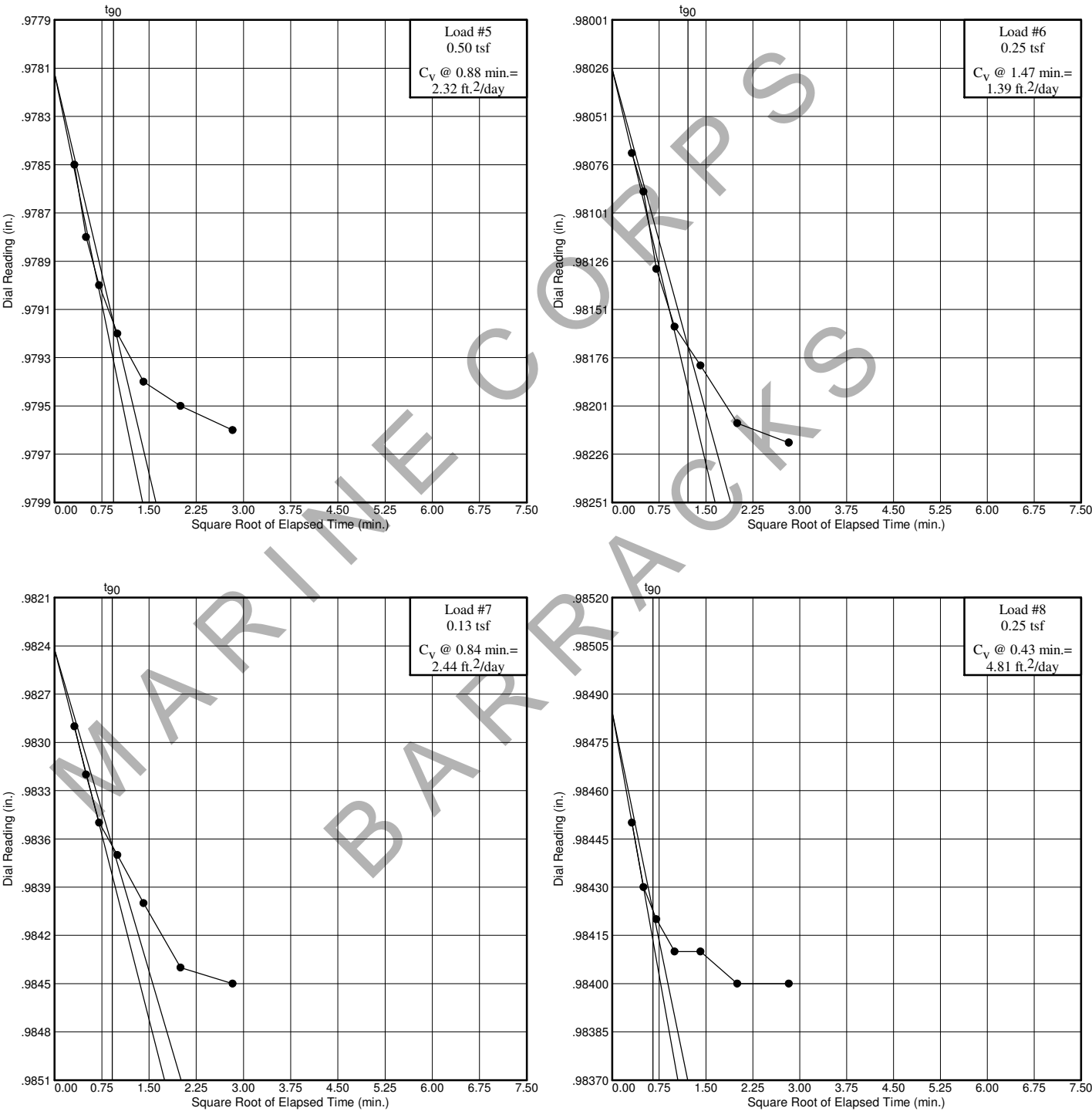
# Dial Reading vs. Time

Project No.: VB09-283G  
Project: Marine AIT Barracks-PN 36113/Site B  
Location: B-2(B) (See Plans)



Dial Reading vs. Time

Project No.: VB09-283G  
Project: Marine AIT Barracks-PN 36113/Site B  
Location: B-2(B) (See Plans)



Dial Reading vs. Time

Project No.: VB09-283G  
Project: Marine AIT Barracks-PN 36113/Site B  
Location: B-2(B) (See Plans)

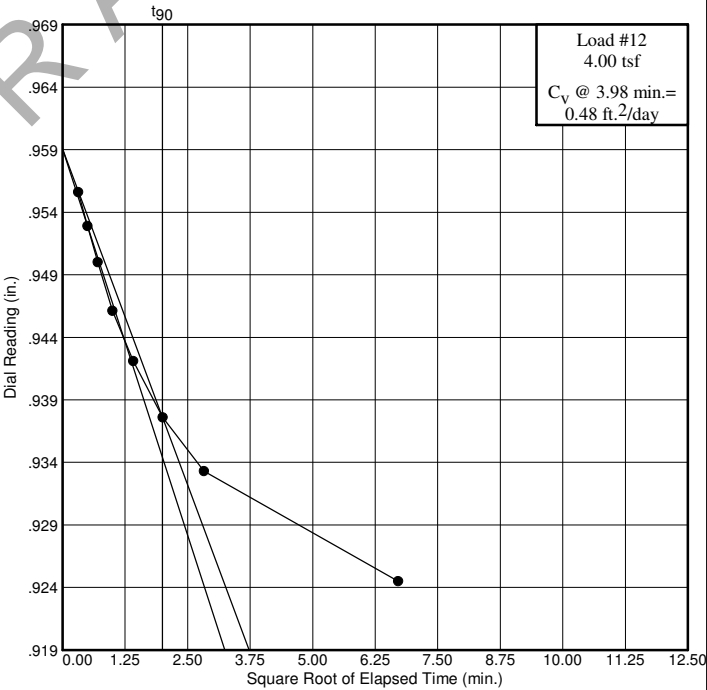
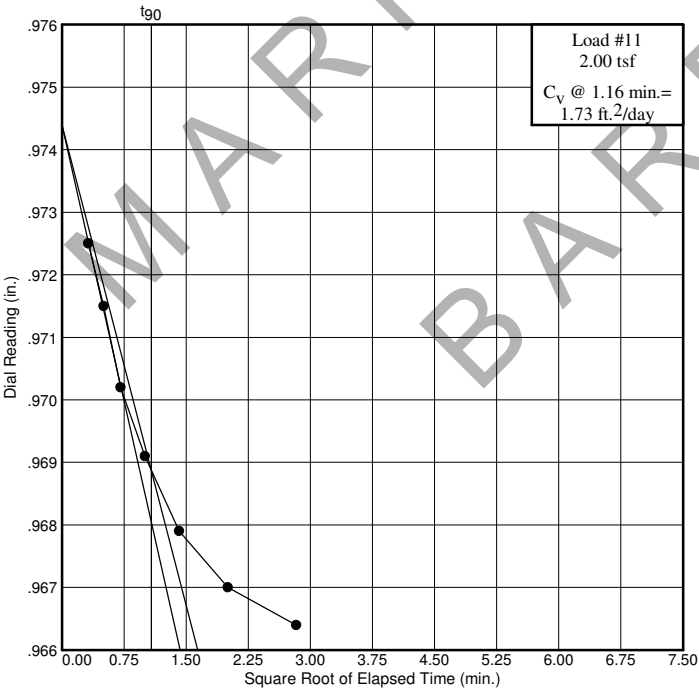
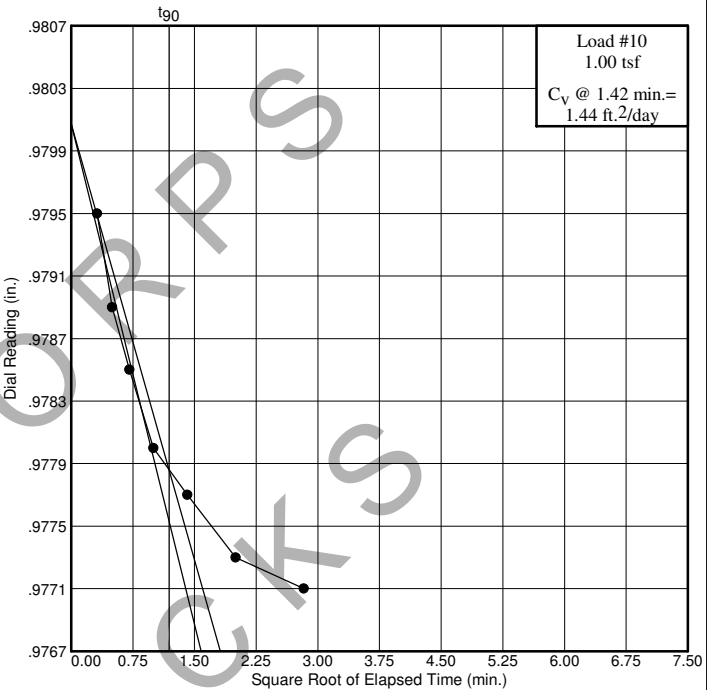
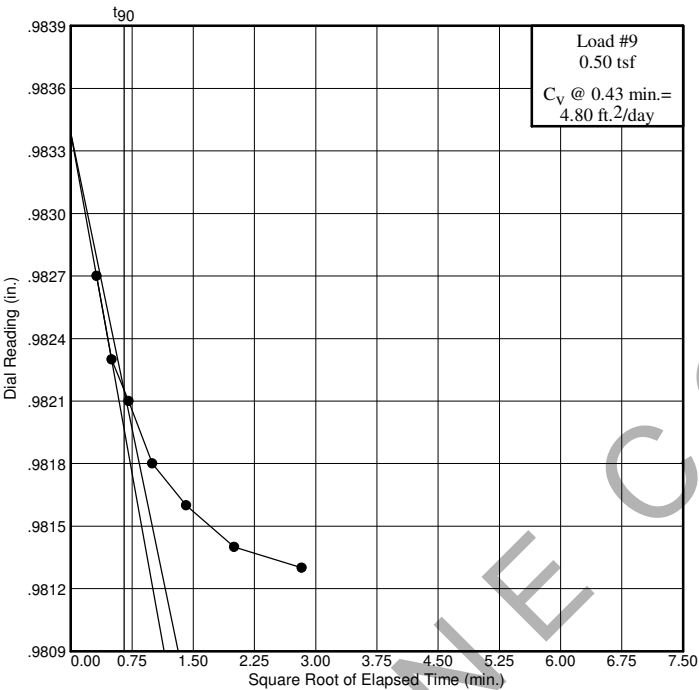
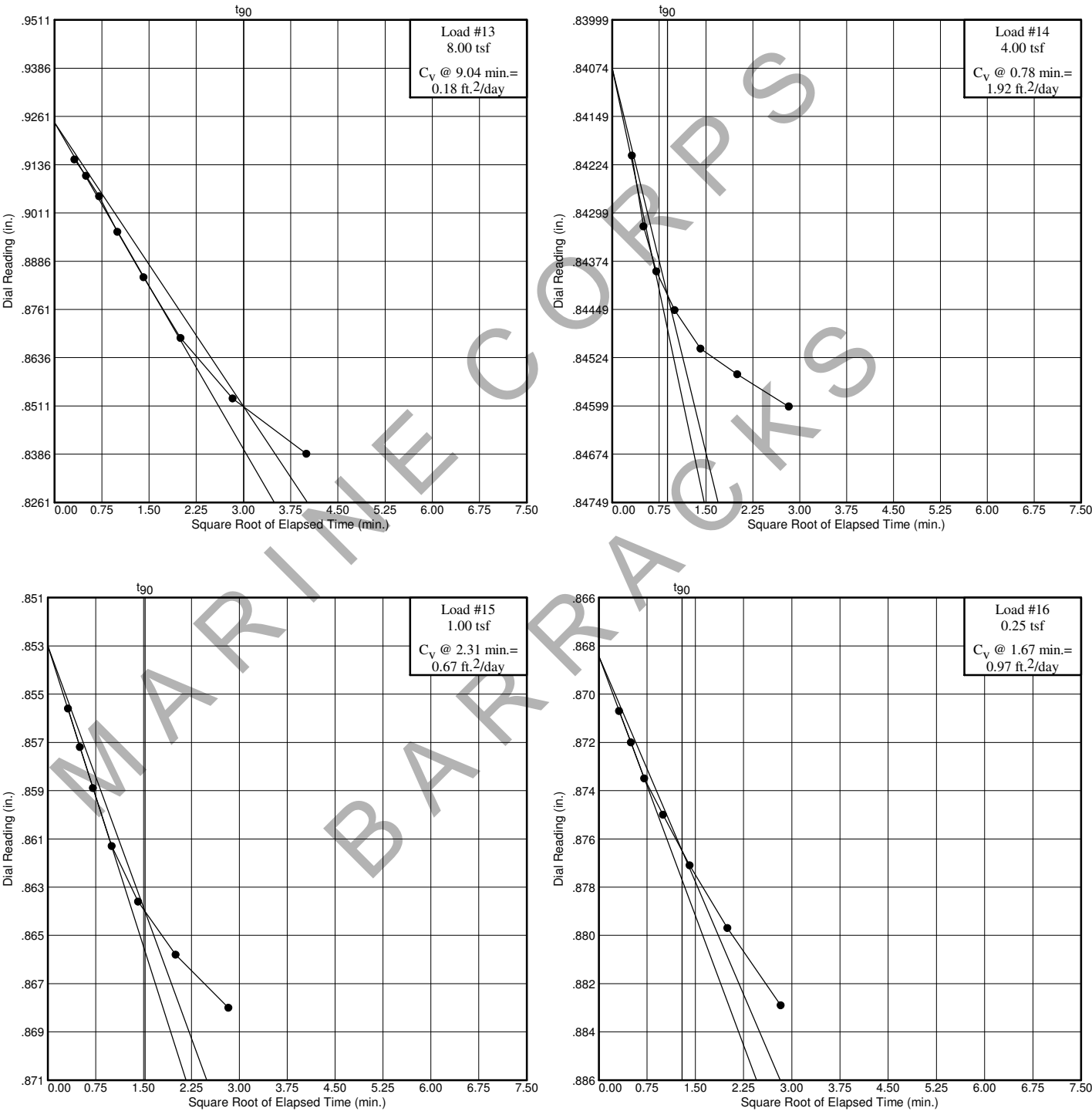


Figure 4



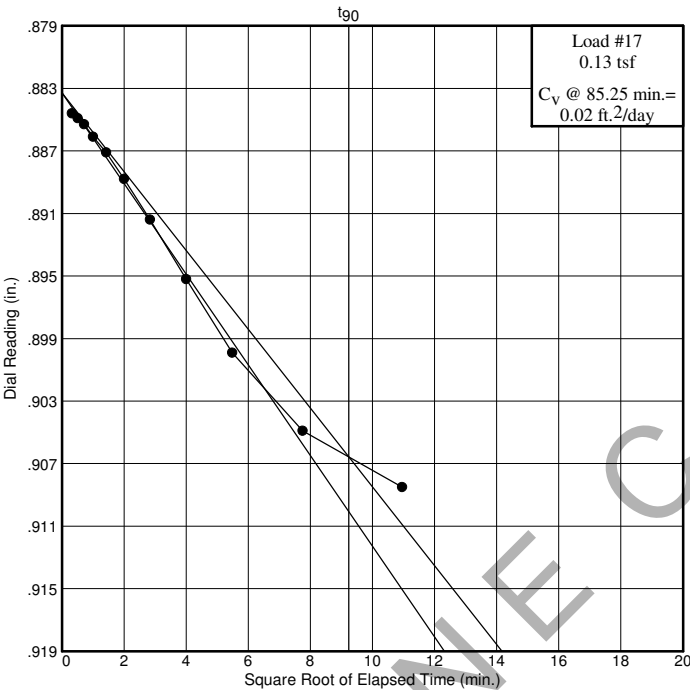
Dial Reading vs. Time

Project No.: VB09-283G  
Project: Marine AIT Barracks-PN 36113/Site B  
Location: B-2(B) (See Plans)



# Dial Reading vs. Time

Project No.: VB09-283G  
Project: Marine AIT Barracks-PN 36113/Site B  
Location: B-2(B) (See Plans)



Dial Reading vs. Time

**GET SOLUTIONS, INC.**

Figure 6

**LOG OF BORING B-2(B)**



# BORING LOG B-2(B)

PROJECT: Marine AIT Barracks-PN 36113/Site B

W9126G-09-D-0046/47/48, RFP 0004

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CLIENT: AECOM

PROJECT LOCATION: Fort Lee, VA-Located between Bldg. 6240 &amp; 6241 PROJECT NO.: VB09-283G

BORING LOCATION: See attached boring location plan

SURFACE ELEVATION:

DRILLER: GET Solutions, Inc.

LOGGED BY: J. Robinson, E.I.T.

DRILLING METHOD: Rotary wash "mud"

DATE: 11-5-09

DEPTH TO WATER - INITIAL\*: 18' AFTER 24 HOURS: 18'

CAVING: C

Elevation (MSL) (ft)	Depth (meters)	Depth (feet)	Description	Graphic	Sample No.	Sample Recovery	Sample Type	Blows per 6"	N-Value	% < #200	TEST RESULTS	
											Plastic Limit	Liquid Limit
											Moisture Content - ●	
											N-Value -	
	0	0	5" Topsoil					3				
			Mottled Orange to Gray, Moist, fat CLAY (CH) with varying amounts of fine Sand, Medium Stiff to Hard		1	19"	SS	3	5			
					2	24"	SS	12	26			
					3	22"	SS	13	36			
	5				4	22"	SS	26	43			
	2		Mottled Orange to Gray, Moist to Wet, Silty fine to medium SAND (SM) with varying amounts of Clay and fine Gravel, Medium Dense to Dense		5	18"	SS	15	32			
		10			6	24"	SS	15	25			
					7	24"	SS	4	18			
	4				8	16"	SS	6	12			
		15			9	12"	SS	3	17			
					10	24"	SS	WOH	0			
		20			11	24"	SS	WOH	2			
			Bluish Gray, Wet, fat CLAY (CH) with trace fine Sand, Very Soft to Soft					WOH				
		25						WOH				
	8							WOH				
		30						WOH				
								WOH				
	10							WOH				
		35						WOH				

Notes: SITE B: New AIT Barracks Complex

SS = Split Spoon Sample  
ST = Shelby Tube Sample  
BS = Bulk Sample  
WOH = Weight of Hammer

Wednesday, November 4, 2010

\*The initial groundwater reading may not be indicative of the static groundwater level.

W9126G-09-D-0046/47/48, RFP 0004

PROJECT NO.: VB09-283G

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**PROJECT LOCATION:** Fort Lee, VA-Located between Bldg. 6240 & 6241

**LOCATION:** See attached boring location plan

ELEVATION:

**DRILLER:** GET Solutions, Inc.

**LOGGED BY:** J. Robinson, E.I.T.

**DRILLING METHOD:** Rotary wash "mud"

**DATE:** 11-5-09

**DEPTH TO - WATER> INITIAL:**  18' **AFTER 24 HOURS:** 

CAVING> C

# BORING LOG

## B-2(B)

[illegible]

**Notes:** SITE B: New AIT Barracks Complex

SS = Split Spoon Sample  
ST = Shelby Tube Sample  
HA = Hand Auger Sample  
BS = Bulk Sample  
WOH = Weight of Hammer

Wednesday, June 16, 2010

*\*The initial groundwater reading may not be indicative of the static groundwater level.*

**This information pertains only to this boring and should not be interpreted as being indicative of the site.**

## Strata symbols



Topsoil



Fat Clay



Silty Sand



Poorly graded Gravel  
and Sand

## Misc. Symbols



Water table during  
drilling

## Notes:

1. Exploratory borings were drilled on 11-5-09 using a 4-inch diameter continuous flight power auger.
2. No free water was encountered at the time of drilling or when re-checked the following day.
3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.



REPLY TO  
ATTENTION OF

**DEPARTMENT OF THE ARMY**  
**NORFOLK DISTRICT, CORPS OF ENGINEERS**  
**FORT NORFOLK, 803 FRONT STREET**  
**NORFOLK, VIRGINIA 23510-1096**

Engineering Branch  
Geo-Environmental Section

1 March 2010

**MEMORANDUM FOR RECORD**

**SUBJECT:** Additional Subsurface Exploration for the Ft Lee USA/USMC Barracks Project  
(PN36113)

1. The Norfolk District completed additional subsurface explorations of the two sites for the USA/USMC Barracks project.
2. An additional Standard Penetration Test (SPT) boring and Dilatometer (DMT) sounding were performed at each project site as follows.
  - a. US Army Barracks - a 60 ft deep SPT boring and a 26 ft deep DMT sounding
  - b. USMC Barracks - a 77.5 ft deep SPT boring and a 55 ft deep DMT sounding

The SPT boring and DMT sounding location drawings and logs are enclosed herein.

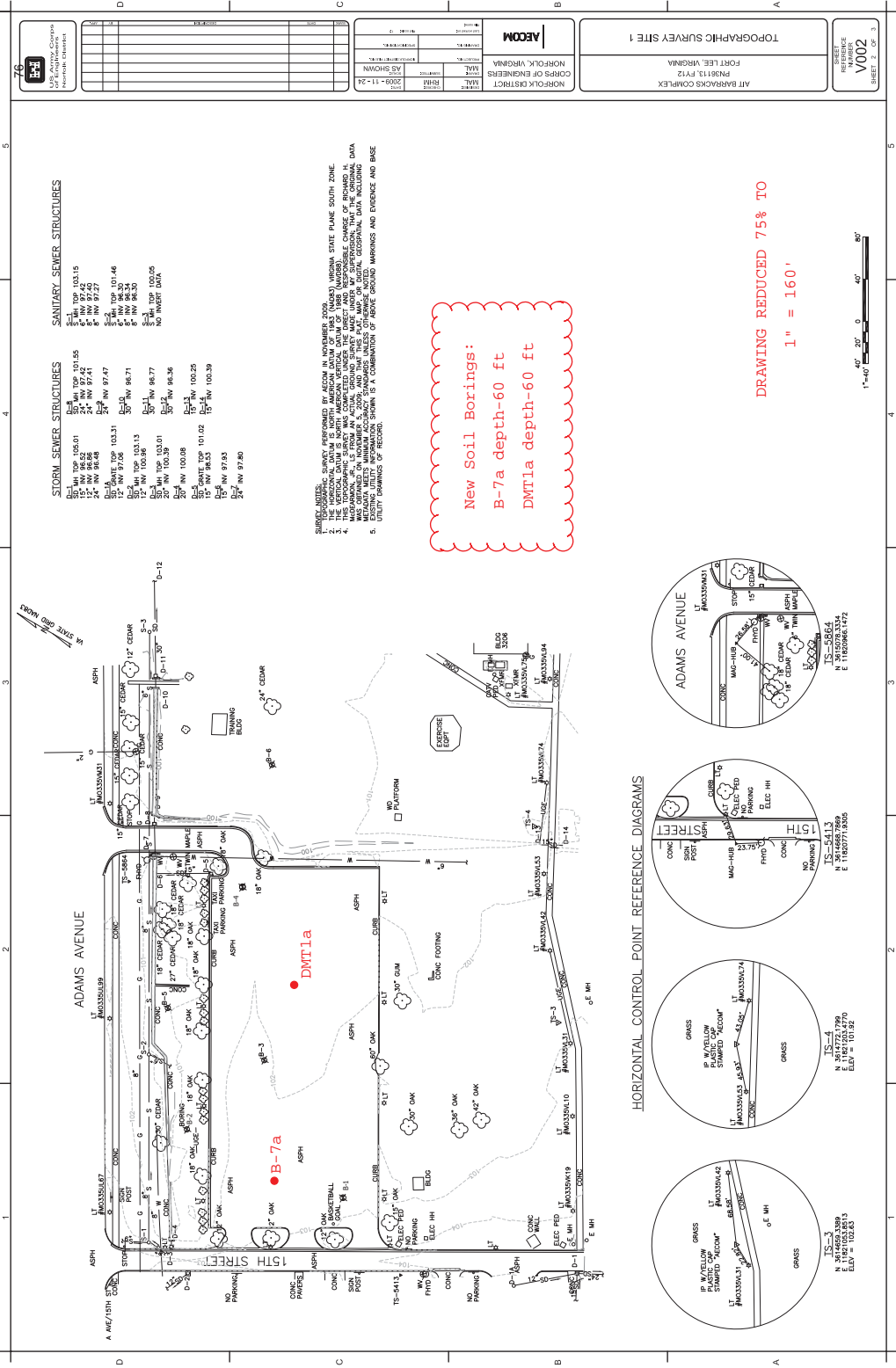
3. Soil samples obtained from the SPT borings were collected and subjected to laboratory testing in accordance with ASTM standards. The results are enclosed herein.

- 3 Encls
1. Location Drawings
  2. Logs
  3. Laboratory Results

**PHILIP A. WUNDERLY, EIT**  
Geo-Environmental Section

Wednesday, June 16, 2010

ARMY BARRACKS





DRILLING LOG		DIVISION NAO		INSTALLATION Ft. Lee		SHEET 1 OF 2 SHEETS	
1. PROJECT USA/USMC Barracks PN 36113				10. SIZE AND TYPE OF BIT 2 1/4" HSA			
2. LOCATION (Coordinates or Station) Adams Ave. & 15th Street				11. DATUM FOR ELEVATION SHOWN (TBM or MSL)			
3. DRILLING AGENCY F & R Inc.				12. MANUFACTURER'S DESIGNATION OF DRILL CME 55			
4. HOLE NO. (As shown on drawing title and file number) B-7a				13. TOTAL NO. OF OVERBURDEN : DISTURBED : UNDISTURBED SAMPLES TAKEN : 15			
5. NAME OF DRILLER D. Drew				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. ELEVATION GROUND WATER NA			
7. THICKNESS OF OVERBURDEN				16. DATE HOLE : STARTED : COMPLETED 2/12/2010 : 2/12/2010			
8. DEPTH DRILLED INTO ROCK				17. ELEVATION TOP OF HOLE +103.0 ±			
9. TOTAL DEPTH OF HOLE 60.0				18. TOTAL CORE RECOVERY FOR BORING %			
				19. SIGNATURE OF INSPECTOR			
ELEVATION (feet) a	DEPTH (feet) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	SAMPLE DEPTH (feet) e	SAMPLE BLOWS f	REMARKS (Drilling time, water loss, dept weathering, etc., if significant) g	
102.4	0.6		[ASPHALT] Approximately 7 inches	S-1 0.0' to 2.0'	11-6-6-4 N=12		
101.2	1.8		[FILL] Medium Dense, Sand and Gravel	S-2 2.0' to 4.0'	4-5-5-8 N=10		
			[CH] Stiff, Mottled Tan and Light Gray, CLAY with Some Silty Fine Sand, Moist	S-3 4.0' to 6.0'	2-5-5-5 N=10		
				S-4 6.0' to 8.0'	4-7-9-9 N=16		
				S-5 8.0' to 10.0'	4-5-6-8 N=11		
90	13.0		[CL] CLAY Encountered	S-6 13.0' to 15.0'	3-5-5-8 N=10	Water Content=27.5% LL=45 PI=31 Passing #200=67.9%	
84.5	18.5		[SW-SM] Loose, Orange, Fine to Coarse SAND with Silt, Saturated	S-7 18.0' to 20.0'	2-2-3-3 N=5	Water Content=23.3% LL=29 PI=3 Passing #200=10.2%	
79.5	23.5		[CH] Firm, Mottled Tan and Light Gray, CLAY, Very Moist	S-8 23.0' to 25.0'	3-3-3-3 N=6	Water Content=41.3% LL=76 PI=53 Passing #200=89.7%	
78	25.0		[SP] Dense to Very Dense, Light Gray and Tan, Fine to Coarse SAND, Some Silty Clay and Fine Gravel, Saturated	S-9 28.0' to 30.0'	38-28-30-21 N=58		
				S-10 33.0' to 35.0'	18-28-28-26 N=56		
				S-11 38.0' to 40.0'	12-14-14-13 N=28		

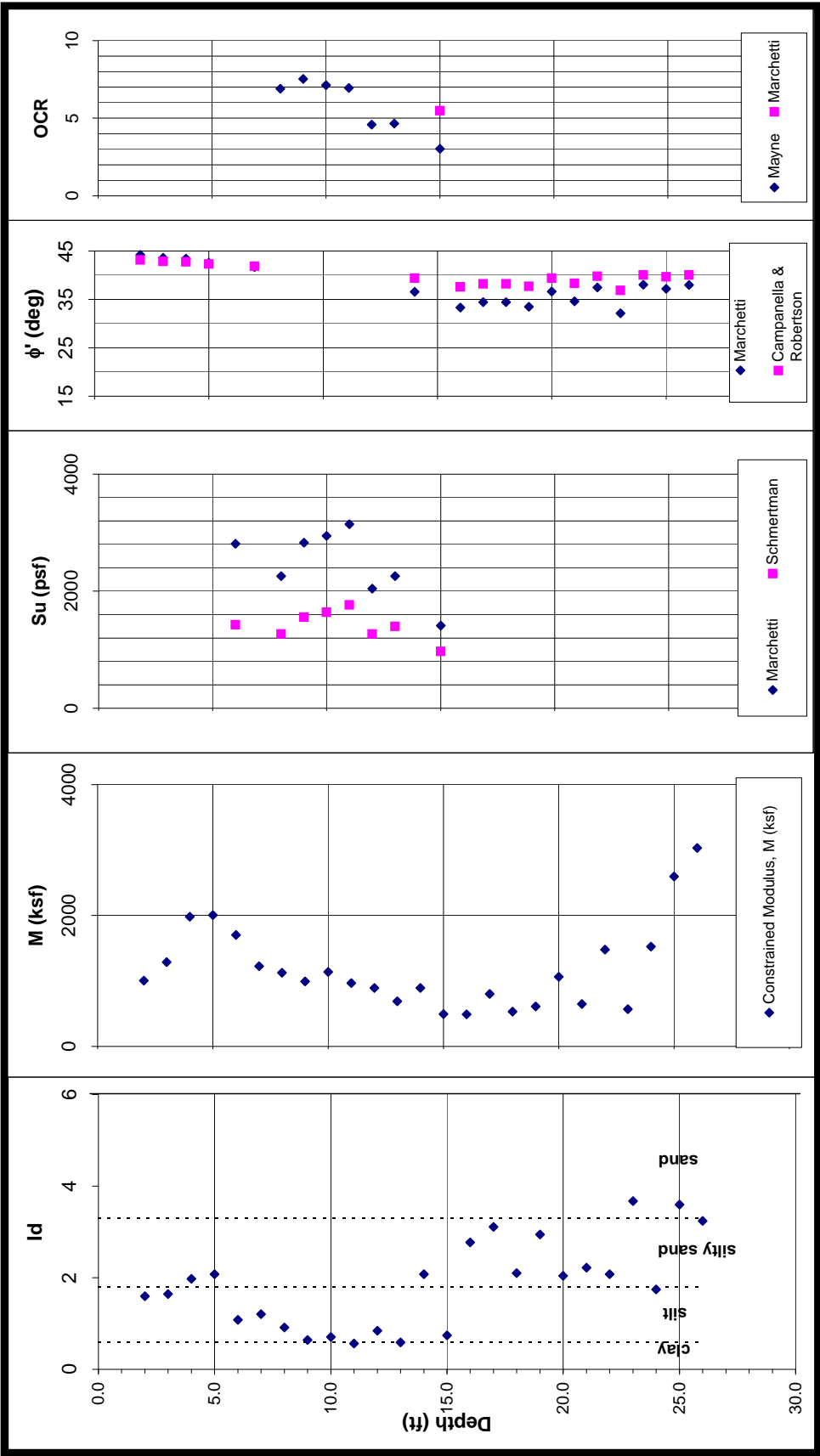
DRILLING LOG		DIVISION NAO		INSTALLATION Ft. Lee		SHEET 2 OF 2 SHEETS	
1. PROJECT USA/USMC Barracks PN 36113				10. SIZE AND TYPE OF BIT 2 1/4" HSA			
2. LOCATION (Coordinates or Station) Adams Ave. & 15th Street				11. DATUM FOR ELEVATION SHOWN (TBM or MSL)			
3. DRILLING AGENCY F & R Inc.				12. MANUFACTURER'S DESIGNATION OF DRILL CME 55			
4. HOLE NO. (As shown on drawing title and file number) B-7a				13. TOTAL NO. OF OVERBURDEN : DISTURBED : UNDISTURBED SAMPLES TAKEN : 15			
5. NAME OF DRILLER D. Drew				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. ELEVATION GROUND WATER NA			
7. THICKNESS OF OVERBURDEN				16. DATE HOLE : STARTED : COMPLETED 2/12/2010 : 2/12/2010			
8. DEPTH DRILLED INTO ROCK				17. ELEVATION TOP OF HOLE +103.0 ±			
9. TOTAL DEPTH OF HOLE 60.0				18. TOTAL CORE RECOVERY FOR BORING %			
				19. SIGNATURE OF INSPECTOR			
ELEVATION (feet) a	DEPTH (feet) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	SAMPLE DEPTH (feet) e	SAMPLE BLOWS f	REMARKS (Drilling time, water loss, dept weathering, etc., if significant) g	
49	54.0			S-12 43.0' to 45.0'	3-5-6-6 N=11		
48	55.0		[CH] Very Stiff, Gray, Sandy, Gravelly CLAY	S-13 48.0' to 50.0'	18-24-21-22 N=45		
			[SP] Medium Dense, Light Gray and Tan, Fine to Coarse SAND, Some Silty Clay and Fine Gravel, Saturated	S-14 53.0' to 55.0'	28-21-15-17 N=36		
43	60.0		Boring Terminated at 60 ft.	S-15 58.0' to 60.0'	12-12-15-17 N=27		

ARMY BARRACKS

DILATOMETER TEST RESULTS



Test ID: DMT-1A  
Site: Site A- AIT Barracks; Fort Lee  
Location: Petersburg, VA  
Project No.: 10-912

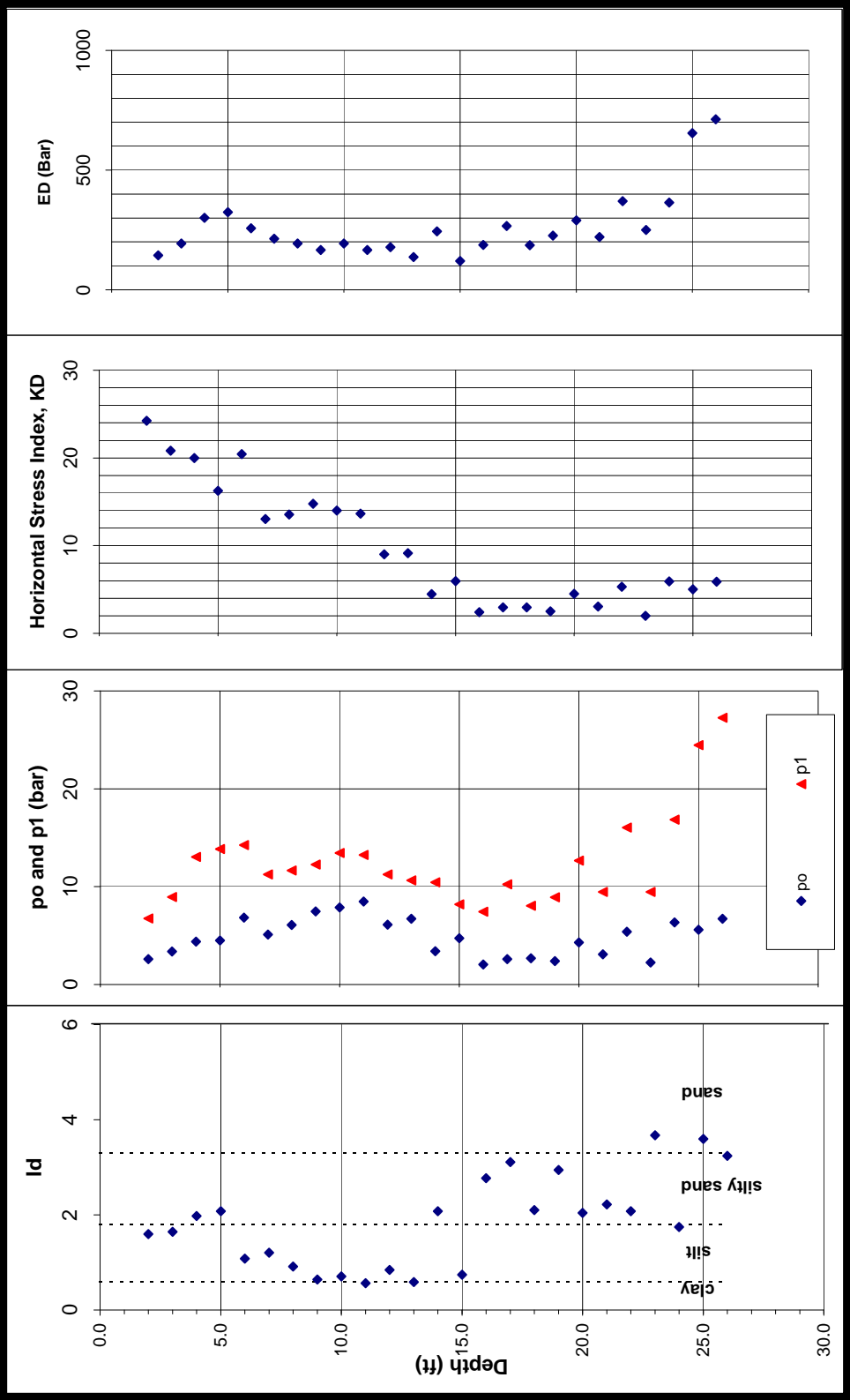


ARMY BARRACKS

DILATOMETER TEST RESULTS



Test ID: DMT-1A  
Site: Site A- AIT Barracks; Fort Lee  
Location: Petersburg, VA  
Project No.: 10-912



[illegible]

DRILLING LOG		DIVISION NAO		INSTALLATION Ft. Lee		SHEET 1 OF 2 SHEETS	
1. PROJECT USA/USMC Barracks PN 36113				10. SIZE AND TYPE OF BIT 2 1/4" HSA			
2. LOCATION (Coordinates or Station) Mahone Ave., South of Lee Ave.				11. DATUM FOR ELEVATION SHOWN (TBM or MSL)			
3. DRILLING AGENCY F & R Inc.				12. MANUFACTURER'S DESIGNATION OF DRILL CME 55			
4. HOLE NO. (As shown on drawing title and file number) B-7b				13. TOTAL NO. OF OVERBURDEN : DISTURBED : UNDISTURBED SAMPLES TAKEN : 18			
5. NAME OF DRILLER D. Drew				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. ELEVATION GROUND WATER NA			
7. THICKNESS OF OVERBURDEN				16. DATE HOLE : STARTED : COMPLETED 2/15/2010 2/15/2010			
8. DEPTH DRILLED INTO ROCK				17. ELEVATION TOP OF HOLE +129.0 ±			
9. TOTAL DEPTH OF HOLE 77.5				18. TOTAL CORE RECOVERY FOR BORING %			
				19. SIGNATURE OF INSPECTOR			
ELEVATION (feet) a	DEPTH (feet) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	SAMPLE DEPTH (feet) e	SAMPLE BLOWS f	REMARKS (Drilling time, water loss, dept weathering, etc., if significant) g	
128.6	0.4		[FILL] Loose, Brown, Fine to Medium SAND with Silty Clay, Moist	S-1 0.0' to 2.0'	2-2-3-4 N=5		
127.6	1.4		[SM] Loose, Brown, Silty Fine to Medium SAND, Trace of Clay, Moist	S-2 2.0' to 4.0'	2-5-5-8 N=10		
			[CH] Stiff, Light Brown, CLAY with Little Fine Sand and Silt, Moist	S-3 4.0' to 6.0'	4-7-7-7 N=14		
124.5	4.5		[CH] Medium Stiff to Very Stiff, Mottled Red and Tan, CLAY with Fine Sand, Moist	S-4 6.0' to 8.0'	5-5-12-12 N=17		
				S-5 8.0' to 10.0'	2-2-3-4 N=5		
116	13.0		[SC] Loose, Mottled Red and Light Brown, Clayey Fine to Coarse SAND	S-6 13.0' to 15.0'	3-3-5-8 N=8		
114	15.0		[CH] Medium Stiff, Light Brown, CLAY, Moist				
				S-7 18.0' to 20.0'	4-4-4-5 N=8		
110	19.0		[SP-SM] Very Loose to Loose, Light Gray, Fine to Coarse Silty SAND, Saturated				
				S-8 23.0' to 25.0'	4-2-2-2 N=4		
105	24.0		4 Inch Layer of Fine Gravel Encountered at 24 feet				
				S-9 28.0' to 30.0'	2-3-3-4 N=6	Water Content=39.2% LL=42 PI=24 Passing #200=56.7%	
101	28.0		[CH] Medium Stiff, Reddish-Brown, Silty, Sandy CLAY with Lense of Peat at 30 feet, Saturated				
				S-10 33.0' to 35.0'	2-2-5-5 N=7	Water Content=30.6% NP Passing #200=18%	
96	33.0		[CH] Soft to Medium Stiff, Tan to Light Gray, CLAY, Moist, with Layers of Loose, Orange, Silty Fine to Medium Sand [SM] at 34 ft. and 39 ft.				
				S-11 38.0' to 40.0'	2-3-5-5 N=8		

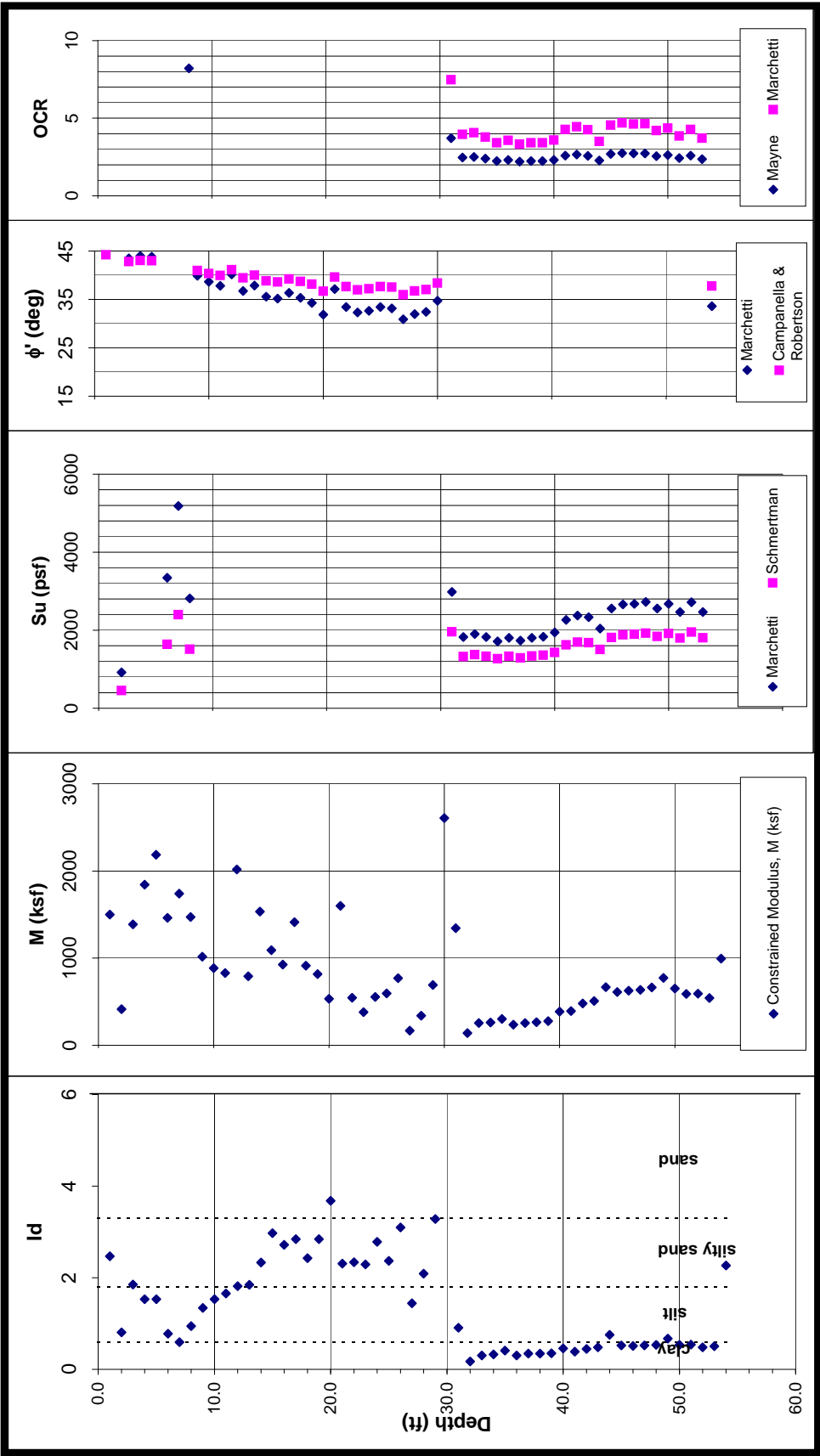
DRILLING LOG		DIVISION NAO		INSTALLATION Ft. Lee		SHEET 2 OF 2 SHEETS	
1. PROJECT USA/USMC Barracks PN 36113				10. SIZE AND TYPE OF BIT 2 1/4" HSA			
2. LOCATION (Coordinates or Station) Mahone Ave., South of Lee Ave.				11. DATUM FOR ELEVATION SHOWN (TBM or MSL)			
3. DRILLING AGENCY F & R Inc.				12. MANUFACTURER'S DESIGNATION OF DRILL CME 55			
4. HOLE NO. (As shown on drawing title and file number) B-7b				13. TOTAL NO. OF OVERBURDEN : DISTURBED : UNDISTURBED SAMPLES TAKEN : 18			
5. NAME OF DRILLER D. Drew				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. ELEVATION GROUND WATER NA			
7. THICKNESS OF OVERBURDEN				16. DATE HOLE : STARTED : COMPLETED 2/15/2010 : 2/15/2010			
8. DEPTH DRILLED INTO ROCK				17. ELEVATION TOP OF HOLE +129.0 ±			
9. TOTAL DEPTH OF HOLE 77.5				18. TOTAL CORE RECOVERY FOR BORING %			
				19. SIGNATURE OF INSPECTOR			
ELEVATION (feet) a	DEPTH (feet) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	SAMPLE DEPTH (feet) e	SAMPLE BLOWS f	REMARKS (Drilling time, water loss, dept weathering, etc., if significant) g	
81	48.0		[GP] Medium Dense to Dense, Light Gray and Brown, Fine to Coarse GRAVEL with Sand, Saturated	S-12 43.0' to 45.0'	3-2-2-4 N=4	Water Content=46.8% LL=56 PI=30 Passing #200=94.4%	
				S-13 48.0' to 50.0'	9-22-15-15 N=37		
				S-14 53.0' to 55.0'	14-14-14-22 N=28		
				S-15 58.0' to 60.0'	14-14-14-17 N=28		
66	63.0		[CH] Stiff to Very Stiff, Mottled Orange and Gray, CLAY, Moist	S-16 63.0' to 65.0'	4-5-7-10 N=12		
60	69.0		[SP] Medium Dense to Dense, Light Gray, Fine to Coarse SAND, with Fine to Coarse GRAVEL, Moist	S-17 68.0' to 70.0'	11-8-13-13 N=21		
				S-18 73.0' to 75.0'	13-18-21-30 N=39		
51.5	77.5		Auger and Split Spoon Refusal at 77.5 ft.				

MARINE CORPS BARRACKS

DILATOMETER TEST RESULTS



Test ID: DMT-1B  
Site: Site B- AIT/USMC Barracks; Fort Lee  
Location: Petersburg, VA  
Project No.: 10-912



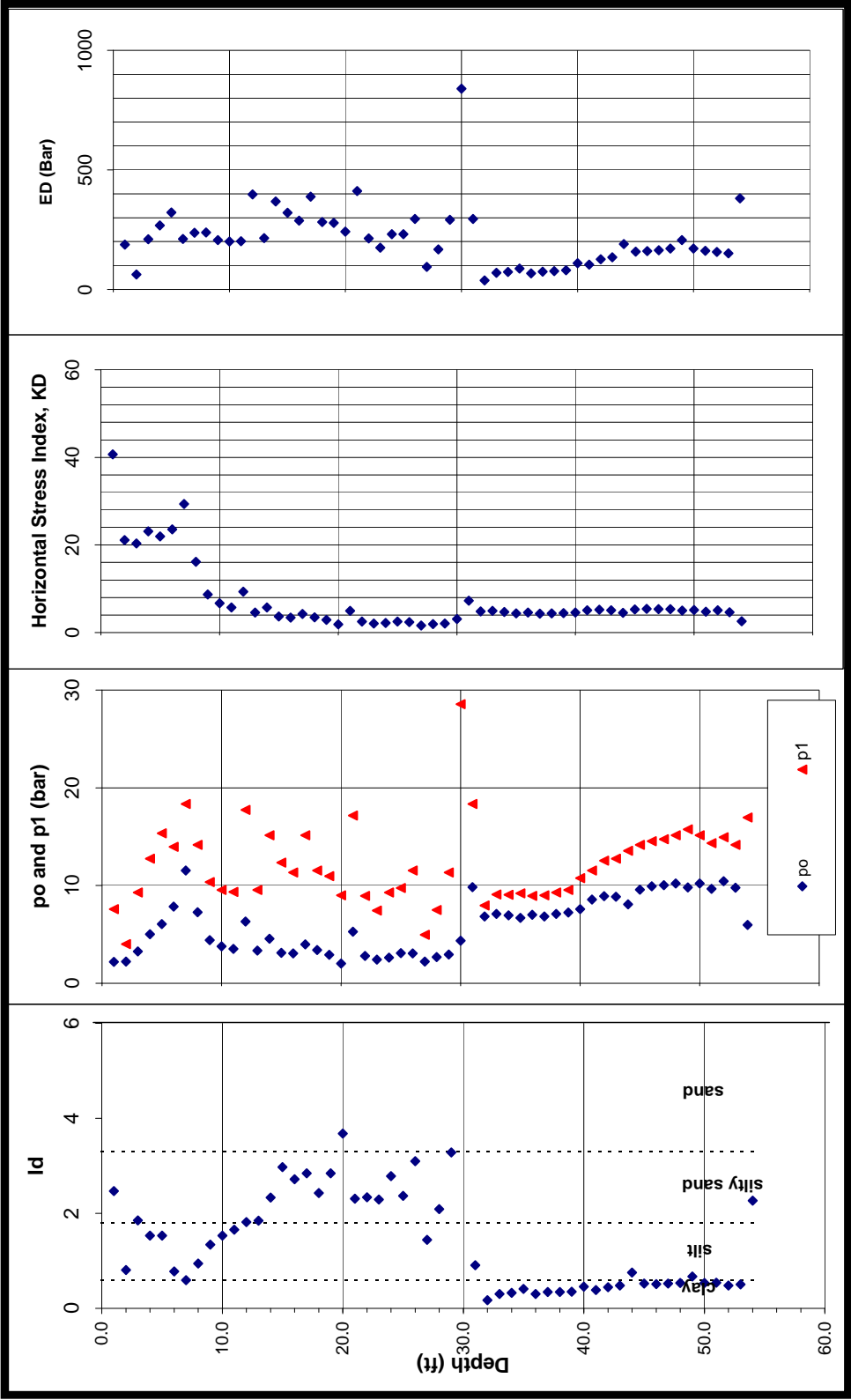


MARINE CORPS BARRACKS

DILATOMETER TEST RESULTS



Test ID: DMT-1B  
Site: Site B- AIT/USMC Barracks; Fort Lee  
Location: Petersburg, VA  
Project No.: 10-912



# Laboratory Test Summary Sheet

Boring/ Sample No.	Depth	LL	PL	PI	% Moisture Content	% Gravel	% Sand	% Fines	USCS Class.	AASHTO Class.	Maximum Dry Density	Optimum Moisture Content	CBR Value @ 0.1
B-7b	28.0	42	18	24	39.2	2.8	40.5	56.7	CL	A-7-6			
B-7b	33.0	NP	NP	NP	30.6	0.0	81.9	18.1	SM	A-2-4			
B-7b	43.0	56	20	36	46.8	0.0	5.6	94.4	CH	A-7-6			
B-7A	13.0	45	14	31	27.5	0.0	32.1	67.9	CL	A-7-6			
B-7A	18.0	29	26	3	23.3	2.4	87.4	10.2	SW-SM	A-1-b			
B-7A	23.0	76	23	53	41.3	0.0	10.3	89.7	CH	A-7-6			

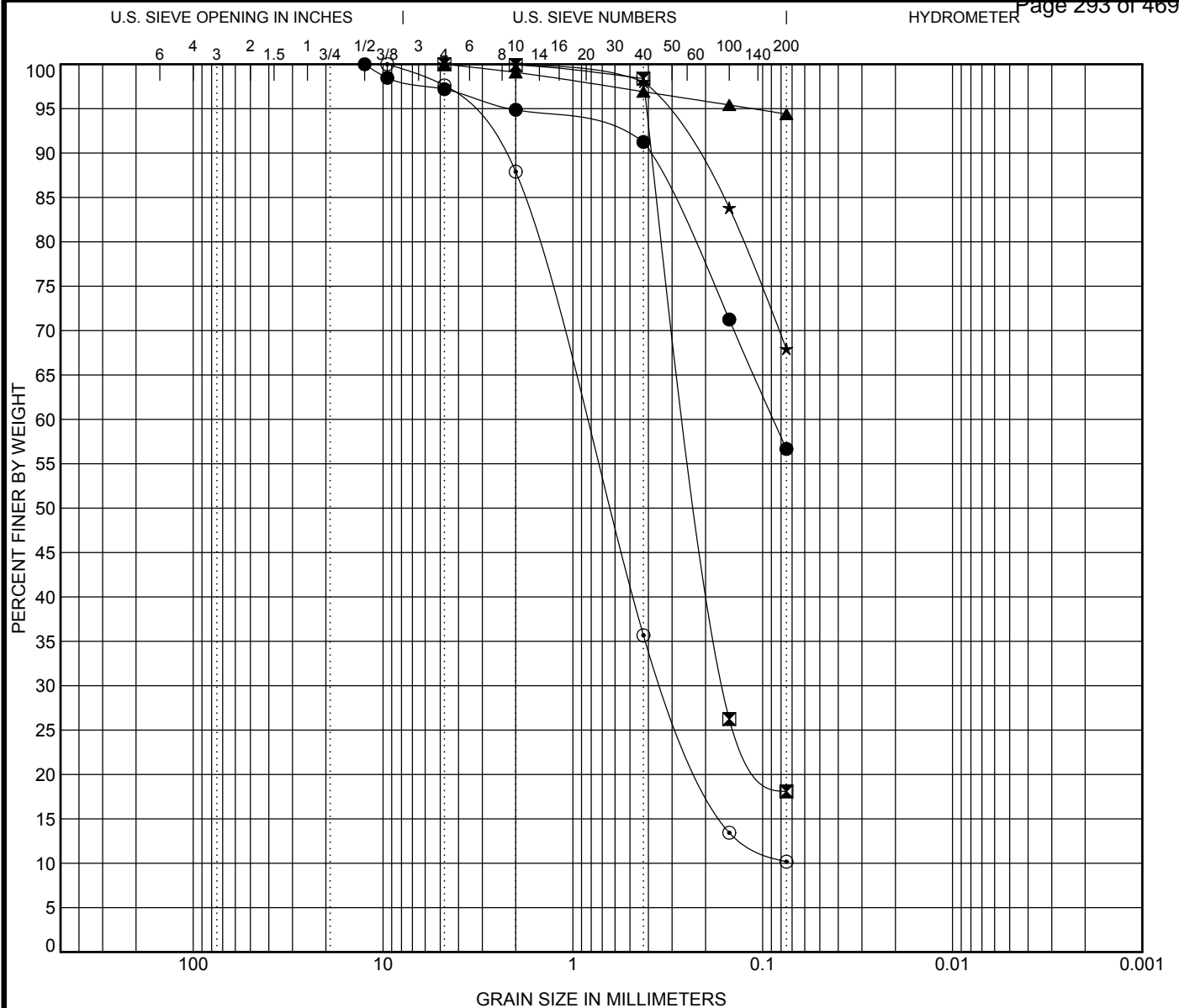
Lab Test Summary	Sheet 1 of 1
Report No.:	60L-5938
Client:	U.S. Army Corp of Engineers
Project:	U.S. Army and USMC Barracks Soil Boring
Location:	Fort Lee, Virginia
Date:	February 2010

SINCE 1881



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Wednesday, June 16, 2010



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

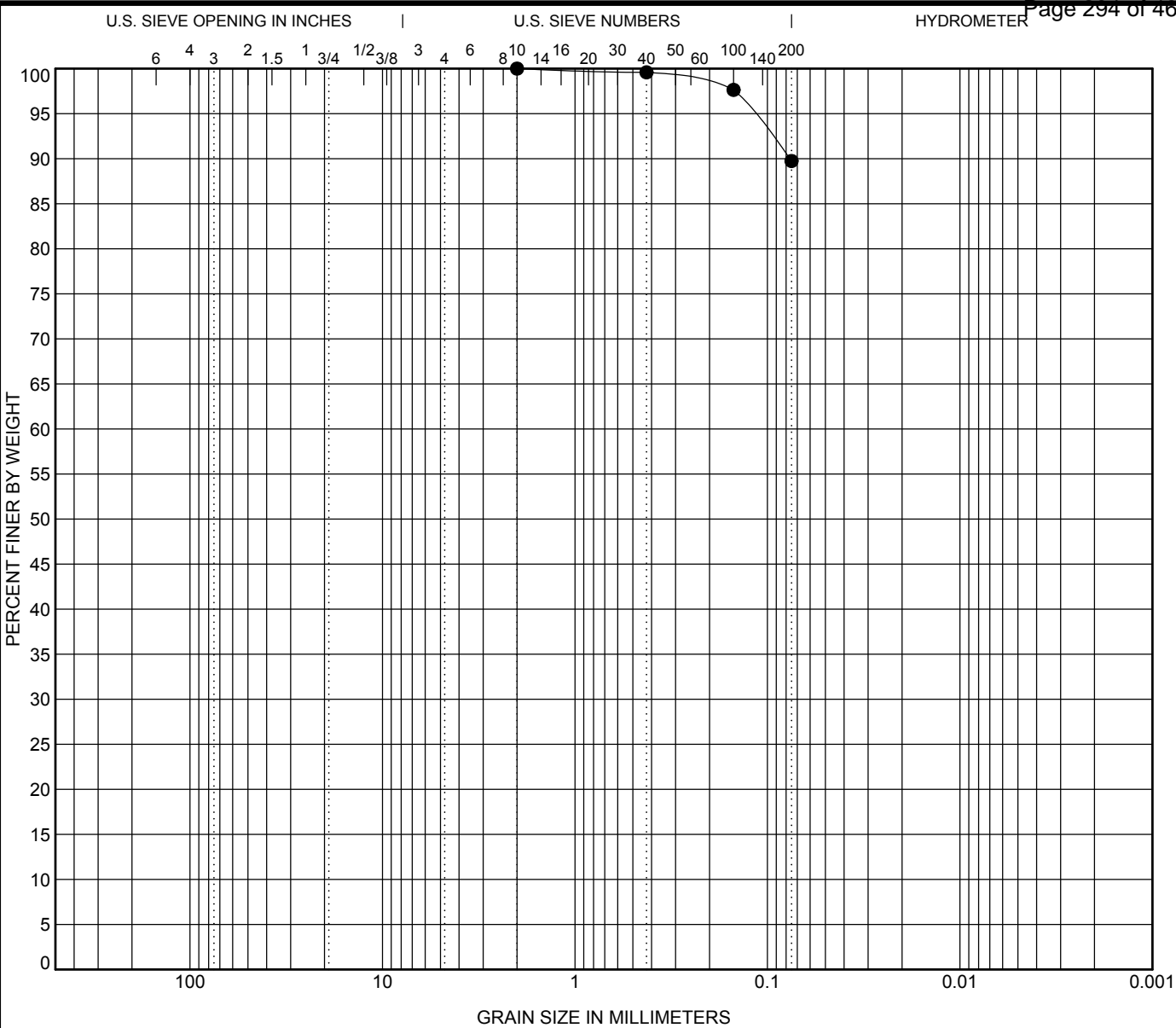
Boring No.				Depth	Classification						LL	PL	PI	Cc	Cu
●	B-7b	at	28.0	SANDY LEAN CLAY (CL)						42	18	24			
☒	B-7b	at	33.0	SILTY SAND (SM)						NP	NP	NP			
▲	B-7b	at	43.0	FAT CLAY (CH)						56	20	36			
★	B-7A	at	13.0	SANDY LEAN CLAY (CL)						45	14	31			
◎	B-7A	at	18.0	WELL-GRADED SAND with SILT (SW-SM)						29	26	3	1.68	12.10	
Boring No.				Depth	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay			
●	B-7b	at	28.0	12.5	0.088			2.8	40.5	56.7					
☒	B-7b	at	33.0	4.75	0.244	0.158		0.0	81.9	18.1					
▲	B-7b	at	43.0	4.75				0.0	5.6	94.4					
★	B-7A	at	13.0	4.75				0.0	32.1	67.9					
◎	B-7A	at	18.0	9.5	0.874	0.326		2.4	87.4	10.2					



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## GRAIN SIZE DISTRIBUTION

**Report No.:** 60L-5938  
**Client:** U.S. Army Corp of Engineers  
**Project:** U.S. Army and USMC Barracks Soil Borings  
**Location:** Fort Lee, Virginia  
**Date:** February 2010 Wednesday, June 16, 2010



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Boring No.	Depth	Classification	LL	PL	PI	Cc	Cu
● B-7A	at 23.0	FAT CLAY (CH)	76	23	53		
	at						
	at						
	at						
	at						

Boring No.	Depth	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● B-7A	at 23.0	2				0.0	10.3	89.7	
	at								
	at								
	at								
	at								

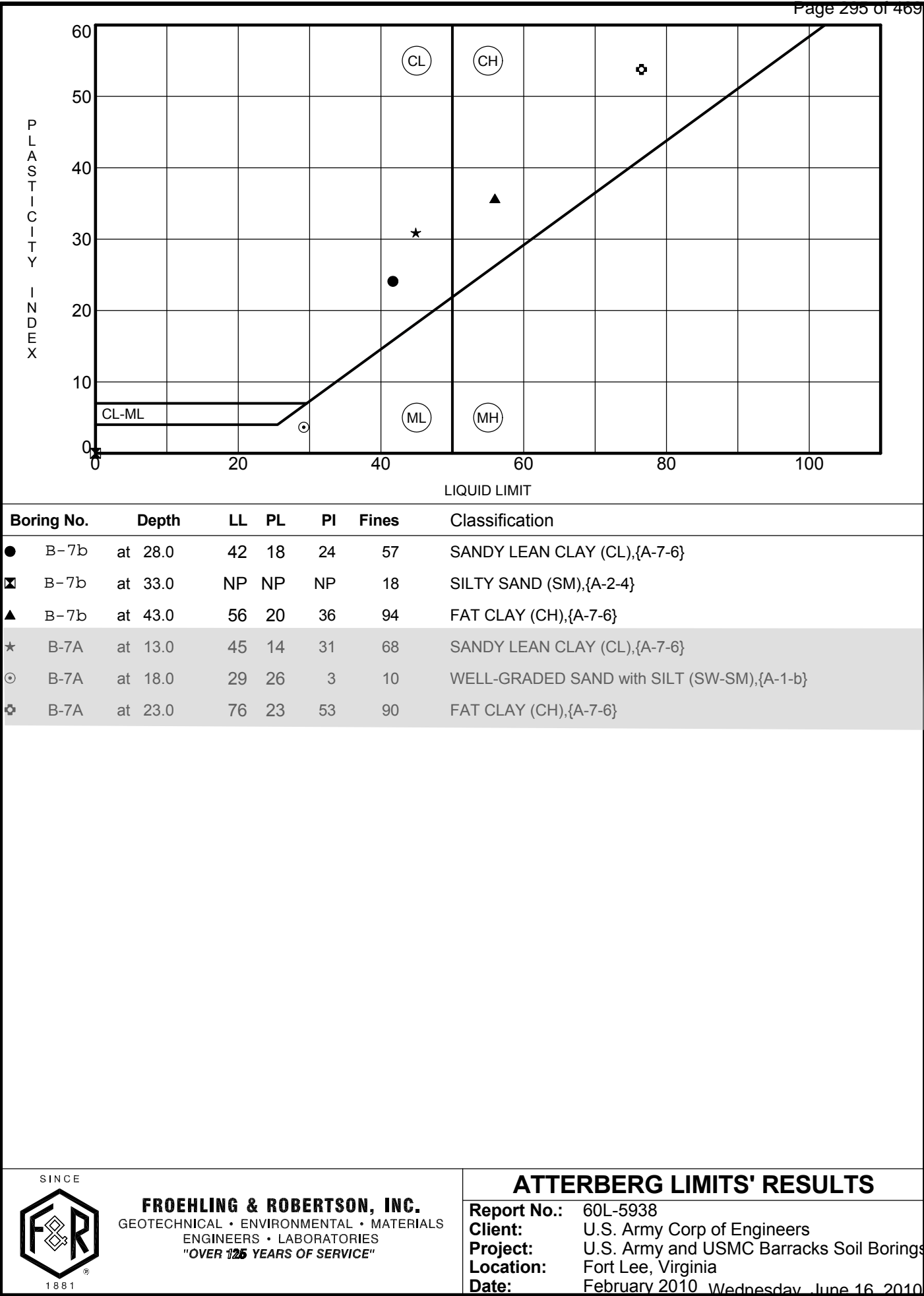


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**GRAIN SIZE DISTRIBUTION**

**Report No.:** 60L-5938  
**Client:** U.S. Army Corp of Engineers  
**Project:** U.S. Army and USMC Barracks Soil Borings  
**Location:** Fort Lee, Virginia  
**Date:** February 2010 Wednesday, June 16, 2010

US GRAIN SIZE 60L-5938.GPJ F&R.GDT 2/24/10



US ATTERBERG LIMITS 60L-5938.GPJ F&R.GDT 2/24/10

APPENDIX B  
List of Drawings

Not Used

## Section: Appendix C. Utility Connections

**UTILITY CONTACT INFORMATION****Sanitary Sewer**

Johnny Butler, City Engineer  
300 North Main Street  
Hopewell, VA 23860  
(804) 541-2319

Mark Haley  
Hopewell Regional Wastewater Treatment Facility  
HRWTF  
P.O. Box 969  
Hopewell, VA 23860  
(804) 541-2210

Larry Malcolm (Ft. Lee Sewer System Operator)  
Old Dominion Utility Services Inc.  
757-888-0485  
[lmalcom@odus.asusinc.com](mailto:lmalcom@odus.asusinc.com)

**Water Supply**

Tim Sheppard (Ft. Lee Water Supply Operator)  
Virginia American Water Co  
804-397-0121

Wesley J. Allen.  
Virginia American Water Co  
804-530-4345 ext 1003  
804-922-0651

Steve McBride  
Prince George County, County Engineer  
804-722-8687

**Electrical Supply**

Andy Oates  
Distribution and Right-of-Way  
Dominion Virginia Power Company  
1340 East Washington Street, Petersburg, VA  
23803  
(804) 862-6046  
[andrew\\_oates@dom.com](mailto:andrew_oates@dom.com)

Harold Thurston  
Dominion Virginia Power Company  
134 East Washington Street  
Petersburg, VA 23803  
804-862-6024  
[Harold.Thurston@dom.com](mailto:Harold.Thurston@dom.com)

**Natural Gas**

Daryl Ecklund  
Columbia Gas of Virginia  
9001 Arboretum Parkway, P.O.Box 35674  
Richmond, VA 23235-0674  
(757) 638-2414  
[decklund@nisource.com](mailto:decklund@nisource.com)

Christian Griffin  
Columbia Gas of Virginia  
(804) 768-6407  
[cgriffin@nisource.com](mailto:cgriffin@nisource.com)

Andrew Watson  
Columbia Gas of Virginia  
(804) 768-6430  
[awatson@nisource.com](mailto:awatson@nisource.com)

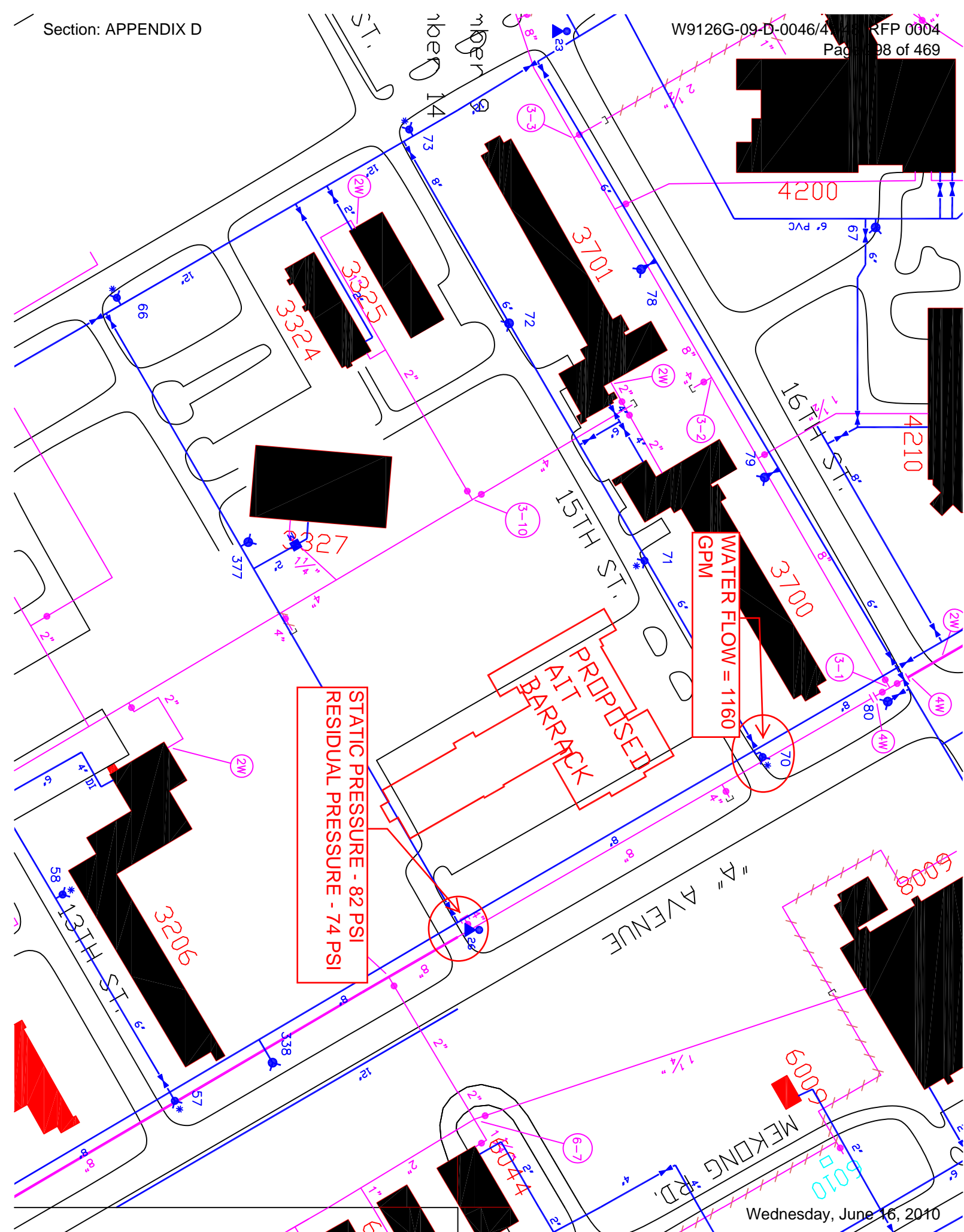
Rob Mooney  
Columbia Gas of Virginia  
(804) 768-6429  
[rmooney@nisource.com](mailto:rmooney@nisource.com)

**VDOT Highway Crossing**

Debbie Williams  
Highway Permits Specialist  
Virginia Department of transportation  
4608 Boydton Plank Road  
Petersburg, VA 23803  
(804) 8634009

Department of Information Management (DOIM)  
Jeffery Gerau  
Information Technology Specialist  
Contracting Office Representative  
2701 C Ave  
Fort Lee, Virginia 23801-1719  
(804) 734-7598  
[jeff.gerau@us.army.mil](mailto:jeff.gerau@us.army.mil)

Jerome Boyd  
Information Technology Specialist  
2701 C Ave  
Fort Lee, Virginia 23801-1719  
(804) 734-7500  
[jerome.boyd@us.army.mil](mailto:jerome.boyd@us.army.mil)





**AUTOMATIC FIRE PROTECTION SPRINKLER SYSTEM**

Preliminary Hydraulic Analysis

PN 36113 - AIT Barracks

(assuming K = 5.6)

**I. System Specifications**

a. Type of Occupancy:	Light Hazard	
b. Building Elevation:	75	ft
c. Pipe Material Prior to Building:	Unlined cast or ductile iron	
d. Distance from Building to Water Main:	200	ft
e. Type of System:	Wet Pipe	
f. Sloped Ceilings (over 1:6 pitch only):	Flat Ceiling	
g. Building Construction:	Noncombustible	

**II. Sprinkler Flow Demand**

a. Sprinkler Density:	0.10	GPM/ft <sup>2</sup>
b. Design Area:	3000	ft <sup>2</sup>
c. Sprinkler Flow Demand:	300	GPM
d. Plus Max Domestic	440	GPM
d. Hose Stream Demand:	250	GPM
Total Demand Required:	<b>990</b>	GPM

**III. Sprinkler Pressure Demand**

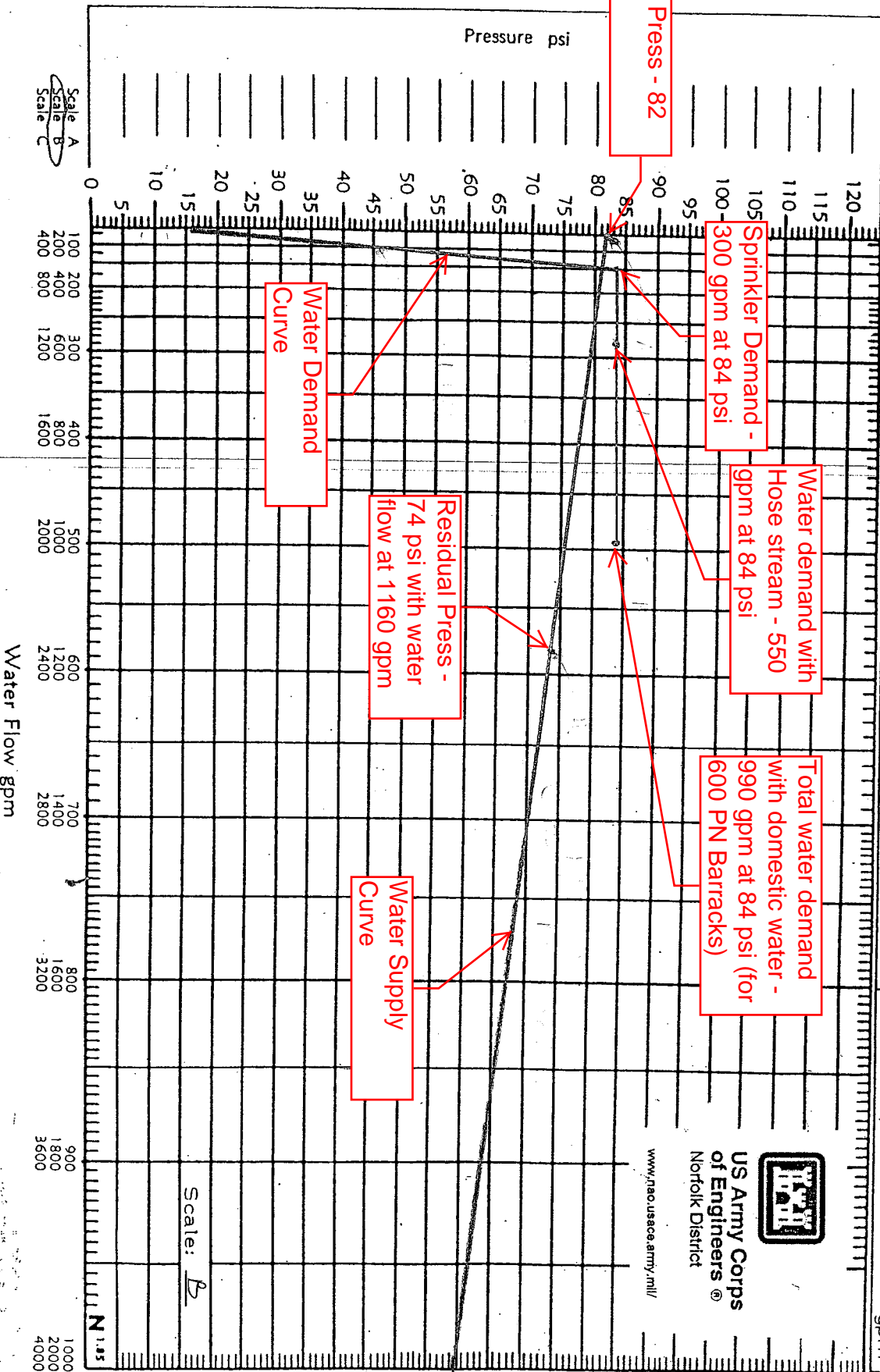
a. Orifice Size:	1/2"	
b. Elevation Loss:	32.51	psi
c. Hazen-Williams C-value:	100	
d. Underground Major Line Loss:	10.00	psi
e. Alarm Check Valve Loss:		psi
f. Building Line Loss:	15.00	psi
g. Backflow Preventer Losses:	10.00	psi
h. Sprinkler Head K-factor:	5.6	
i. Coverage per Sprinkler Head:	225	ft <sup>2</sup>
j. Sprinkler Pressure demand:	16.14	psi
Total Pressure Required:	<b>83.65</b>	psi

WATER FLOW TEST SUMMARY SHEET

Hydrant No.	Outlet I.D. inches	Pitot Press. psi	Flow gpm	Residual psi
1				
2				
3				
Total Flow				

Date: 3/9/10	Time: 1330 hrs	Cont. No.
Cont. Name: A AVENUE		
Address: ALT BARRACKS - PN 36113		
Static Press: psi	Flow @ 20 psi	gpm



**US Army Corps of Engineers**  
Norfolk District  
www.nao.usace.army.mil/

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**SECTION 01 35 40.00 50****FORT LEE ENVIRONMENTAL SPECIAL CONDITIONS****Revision Date: 6/3/10****PART 1 GENERAL**

Environmental Protection - All work is to be performed in a manner that prevents pollution, protects the environment, and conserves natural and cultural resources.

Federal agencies are required by the Energy Policy Act of 2005 (P.L. 109-58), Executive Order 13423, Energy Independence and Security Act (EISA) of 2007, and Federal Acquisition Regulation (FAR) Section 23.203 to incorporate the performance criteria used for ENERGY STAR®-qualified and FEMP-designated products into procurement contracts for energy consuming products and systems. Criteria for ENERGY STAR Qualified products are attached or can be viewed at: [http://www.energystar.gov/index.cfm?fuseaction=find\\_a\\_product](http://www.energystar.gov/index.cfm?fuseaction=find_a_product)

All work performed under this contract shall be carried out in accordance with all applicable Federal, state, and local laws, ordinances, regulations, Executive Orders, court orders, and other types of rules or rulings having the same effect of law and USAG Fort Lee Policies. These include but are not limited to:

- a) EO 13423, Strengthening Federal Government, Energy, and Transportation Management, 26 Jan 07
- b) Resource Conservation and Recovery Act (RCRA) (40 CFR 260-270)
- c) Federal Water Pollution Control Act, as amended (33 USC Sec 1251 ET SEQ)
- d) The Clean Air Act, as amended (42 USC Sec 1857 ET SEQ)
- e) The Endangered Species Act, as amended (16 USC Sec 1531, ET SEQ)
- f) The Toxic Substances Control Act, as amended (15 USC Sec 2601, ET SEQ)
- g) The Solid Waste Disposal Act, as amended (42 USC 6901 ET SEQ)
- h) The Archaeological and Historic Preservation Act, as amended (16 USC Sec 469, ET SEQ),
- i) The Energy Policy Act of 2005
- j) The Energy Independence and Security Act of 2007, 19 Dec 07
- k) The Virginia Solid Waste Management Regulations (9VAC 20-80)
- l) DOD 4170.11, Installation Energy Management, 22 Nov 05
- m) Memorandum, Assistance Chief of Staff for Installation Management, Sustainable Management of Waste in Military Construction, Renovation and Demolition Activities, 6 Feb 06
- n) AR 415-15, Army Military Construction & Non-Appropriated Funded Construction Program Development and Execution, 12 Jun 06
- o) Department of the Army Memorandum: Requirements for Sustainable Management of Waste in Military Construction, Renovation, and Demolition Activities (5 July 2006)

**1.1 SUBMITTALS**

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01 33 00.00 50 SUBMITTAL PROCEDURES:

**SD-03 Product Data**

Pollutant Emitting Equipment;  
Boilers;  
Hot Water/Steam Boilers and/or Water Heaters;

**SD-07 Certificates**

Asbestos Abatement Plan;  
Asbestos Abatement or Removal Notification;  
Asbestos Manifests;  
Borrow Source;  
Borrow Source Sampling Plan;  
Environmental Protection Plan  
Erosion and Sediment Control Plan;  
Hazardous Materials Usage and Reporting;  
Hazardous Materials Management Program;  
Lead Abatement Plan;  
Manifests;  
Pest Management Plan;  
Re-Use, Recycling and Disposal Reporting;  
Stormwater Permit;  
Trip Tickets;  
Waste Soil;

**1.2 WASTE DISPOSAL****1.2.1 Solid Waste Re-Use, Recycling, and Disposal****1.2.1.1 Compliance with Regulations**

The Contractor shall collect all solid wastes generated during the performance of the contract in a container located in an area designated by the Contracting Officer. The Contractor shall provide appropriate containers for the collection and segregation of solid wastes, recyclables, and C&D debris generated directly and indirectly by work under this Contract. The Contractor is prohibited from using Installation dumpsters or other government owned/leased waste receptacles for the disposal of any solid wastes. All solid wastes shall be re-used, recycled, or disposed of prior to completion of work at Fort Lee.

The Contractor must, prior to removing any waste from Fort Lee, properly classify each waste stream. Classification can be made based on generator knowledge or through laboratory analysis. The identification and classification of each waste stream shall be shown in the waste management plan. If the government has previously identified and classified the waste stream, that fact should be noted in the waste management plan. All hazardous waste removed from Fort Lee must be accompanied by a Uniform Hazardous Waste Manifest, including Fort Lee's EPA ID number and must be signed by the Fort Lee Hazardous Waste Manager, 804-734-3811 or 804-734-3772.

Under no circumstances will any solid wastes, hazardous materials, or hazardous wastes be left at Fort Lee at the end of the project. Before the project is turned over to the government, the contractor will remove all solid wastes, hazardous materials, and hazardous wastes from the installation. Those items include, but are not limited to, dirt piles, concrete piles, asphalt piles, and rubbish piles. No materials will be left for the future use of the government UNLESS instructed to do so in writing by the government. This is to include

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the before mentioned items and also regular or touch-up paint, plaster, solvents, etc. If it is determined that the contractor left materials/wastes behind, services may be terminated and/or a penalty payment to include the cost of disposal of the material by the government may be withheld from the project payment.

Hazardous materials are different from hazardous wastes. Hazardous wastes shall not be removed from the installation without the Hazardous Waste Manager or other qualified EMO personnel signing the Hazardous Waste Manifest. The Fort Lee Hazardous Waste Managers can be contacted at 734-3881/3772 and (cell) 400-5538/6104 if needed.

#### **1.2.1.2 Construction/Demolition Debris Diversion**

As good stewards of the environment, the government is committed to diverting its waste away from landfills to the greatest extent possible. This can be done through:

- 1) Re-using (when authorized and directed by the government)
- 2) Recycling
- 3) Donating construction and demolition debris materials.

The contractor shall recycle all construction/demolition debris to the maximum extent possible. The Contractor shall make every effort to recycle materials such as, but not limited to, concrete (including concrete with rebar), brick, asphalt, all metals, including piping, building insulation, wood, wood paneling and wainscoting, roofing materials, wallboard, carpet, ceiling tiles, floor tiles, cardboard, and similar that do not constitute, in and of themselves, or in combination with other materials, hazardous materials. With prior coordination through the CO, Fort Lee Recycle Center, and DOL/DPW, EMO, the contractor may take scrap metals to the Fort Lee Recycling Center for recycling.

Refer to Appendix EE "List of Local Recyclers" for some suggested local sites for recycling of construction and demolition debris. The Government does not warrant that these facilities will, in fact, accept any particular materials. The Government does not warrant that any or all of these entities are still in operation.

#### **1.2.1.3 Re-Use, Recycling and Disposal Reporting**

The Contractor shall report on a monthly basis the tonnage of items re-used, recycled, land-filled, and disposed by regular or waste-to-energy incineration to the Contracting Officer and the Environmental Management Office's Pollution Prevention Manager, Fort Lee Recycling Coordinator by the 10th day of each month during the period of performance. This report will be for the previous month. The report shall list the title of the project, the contract number, the Contractor's company name and point-of-contact, phone number, the type of items (i.e. concrete, concrete with rebar, asphalt, brick, scrap metals, wood, wallboard, etc), and the tonnage of those items re-used and recycled. For all items that can not be re-used or recycled, the contractor shall provide justification.

For items disposed of, a total tonnage shall be provided for items land-filled and a separate total tonnage provided for items incinerated, (specify waste incinerator or waste-to-energy incinerator), unless the contractor prefers to report disposal figures for the various items. For items that cannot be accurately measured, estimates will be sufficient. Use the form at Attachment 1 to report this information to the Contracting Officer and the Environmental Management Office's Pollution Prevention Manager, Fort Lee Recycling Coordinator, e-mail to [john.w.ballinger@us.army.mil](mailto:john.w.ballinger@us.army.mil).

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DOL/DPW, EMO  
Attn: Recycling Coordinator Manager  
1816 Shop Road, Bldg 6206  
Fort Lee, VA 23801

#### **1.2.1.4 Contain Loose Debris**

Loose debris on trucks leaving the site shall be loaded in a manner that shall prevent dropping of materials on streets and conform to local ordinances/laws. Fasten a suitable cover, such as a tarpaulin, over the load before entering surrounding streets.

#### **1.2.1.5 Trip Tickets**

Contractor shall submit all trip tickets from the landfill facility, incinerators, and recycling companies to show all debris is being land-filled, incinerated, re-used, or recycled in accordance with all Federal requirements and in an approved location. These trip tickets will be submitted to the Contracting Officer.

### **1.2.2 Petroleum Contaminated Waste**

#### **1.2.2.1 Contaminated Absorbents**

All petroleum spills must be cleaned up using absorbent materials. Spills caused by the contractor will be the contractor's responsibility to containerize and dispose of the contaminated absorbent material. Spills caused by the government will be the responsibility of the government. Contact the Hazardous Waste Manager at 804-734-3811/3772 to arrange for pick-up of contaminated absorbent resulting from Government actions.

#### **1.2.2.2 Waste Soil**

Suspect soil must be tested to determine if it contains any contaminants prior to relocating it. Testing and disposal of soil shall follow Virginia Solid Waste Management Regulations 9VAC-20-80-700 (soil contaminated with petroleum products). Testing shall include: Total Petroleum Hydrocarbon (TPH) Gasoline Range Organics (GRO) and Diesel Range Organics (DRO), Benzene, Toluene, Ethyl Benzene, and Xylene (BTEX), Total Organic Halides (TOX) and a Paint Filter Test. If test results determine "other than clean", the material will have to be transported to an appropriate landfill or processing center based on the contaminants identified. Contaminated soils, in sludge or slurry form, shall be containerized and managed as either hazardous waste or non-regulated waste, depending on what contaminate was spilled. The containerized contaminated soil shall be the responsibility of the contractor to dispose of such. DOL/DPW, EMO must review the sample results and sign all hazardous/non hazardous waste manifests prior to disposal. Contact the DOL/DPW, EMO Hazardous Waste Program Managers for additional information.

Under No Circumstances will soil, clean or contaminated, from Fort Lee be delivered to or donated to off-base sources (other than an appropriate landfill or processing center based on the contaminants identified) for use.

### **1.2.3 Universal Waste**

#### **1.2.3.1 Fluorescent Lamps**

Upon removal of old lamps and high intensity bulbs, the contractor will box the lamps and manage them as universal waste. Contact the Fort Lee Hazardous Waste Manager at 804-734-3811/3772 for information on recycling.

#### **1.2.4 Ballasts**

Upon removal of fluorescent light ballasts, contractor will separate PCB and non-PCB ballasts and place them in DOT-approved containers suitable for shipment. Contact the Fort Lee Hazardous Waste Manager to arrange for disposal/recycling, (804) 734-3811/3772.

#### **1.2.5 Hazardous Waste Management**

##### **1.2.5.1 Site Management**

All material containers must be closed when not in use. Materials are to be covered for protection from the weather. Each container is to be properly labeled. Do not store hazardous materials or portable toilets near storm drains. Upon completion of this project the contractor shall remove all hazardous materials and hazardous waste (for associated manifest requirements see paragraph 1.1.5.3.)

##### **1.2.5.2 Hazardous Waste in Excess of 55 Gallons**

Hazardous waste in excess of 55-gallons must be manifested off Fort Lee within 72 hours of generation, in order to comply with the requirements of the satellite accumulation rule. If, in an emergency, waste in excess of 55-gallons must be stored on site for more than 72 hours, arrangements must be made to use Fort Lee's 90-day storage site. Contact Hazardous Waste Manager (804) 734-3772/3811.

##### **1.2.5.3 Manifests**

DOL/DPW, EMO will review all lab analysis or MSDS of wastes prior to signing manifests. All hazardous waste manifests must be signed by DOL/DPW, EMO prior to removal of such waste from the base. The generator copy of the manifest must be returned to DOL/DPW, EMO, 1816 Shop Road, Fort Lee VA 23801 within 10 days of removal of waste from the installation.

#### **1.3 FUEL, SEWAGE, and OTHER SPILLS**

In the event of a fuel, sewage, and other toxic spillage during the performance of this contract, the Contractor shall be responsible for its containment, clean up, disinfection/sterilization, and related disposal costs and will notify the Fort Lee Fire Department immediately by calling 911, then immediately notify the Contracting Officer and DOL/DPW, EMO (804-734-3772/3811). The contractor shall have sufficient spill response supplies readily available on the pumping vehicle and/or at the site to contain any spillage and disinfect contaminated areas. In the event of a Contractor-related release, the Contractor shall immediately notify the Environmental Management Office and the Contracting Officer and take appropriate actions to correct its cause and prevent future occurrences. If the federal, state, or local authorities assess any monetary fine, penalty, or assessment related to the release of any substance by the Contractor, his/her employees, or agents during the performance of this contract, the Contractor shall be solely liable for its payment, authorizes the United States Army to withhold such from payment, and otherwise indemnify and hold the United States Army harmless.

#### **1.4 ASBESTOS OR LEAD BASED PAINT**

Asbestos containing building materials may not be used on the project. Contact DOL/DPW, EMO to determine the extent of Asbestos Containing Materials or Lead Based Paint present.

##### **1.4.1 Asbestos Presence**

If asbestos not previously known to exist is exposed, the Contractor shall cease work in the affected area and notify the Contracting Officer immediately.

#### **1.4.1.1 Asbestos Abatement Plan**

The Contractor will submit abatement plans that include but not be limited to the following elements: (b) required notifications and schedule Contractor will use to comply with notification deadlines, requirements; (c) Contractor's and subcontractor's current licensing, certifications, fit test, safety requirements and air sampling documentation; and (d) drawings of the locations of negative air machines, decontamination units, and waste dumpsters. As soon as practicable, Contractor will submit final air clearance results to the USACE Contracting Officer for forwarding to DPW-EMO. Upon review of final air clearance results, DPW-EMO will notify the USACE COR whereupon the Contractor will receive formal communication originated by DPW-EMO that sample results meet the applicable performance standards prior to containment teardown for work area re-occupancy. Contractor will submit the Abatement Plan, revisions, and all other associated documentation requested by DPW-EMO to the COR and Installation Asbestos Program Manager (APM) prior to the initiation of work. The plan must be approved by the APM.

#### **1.4.1.2 Asbestos Abatement or Removal Notification**

If project requires asbestos removal the contractor is responsible for disposal of Asbestos waste and debris. Contractor is subject to OSHA, EPA and Commonwealth of Virginia compliance and inspection for asbestos removal. Contractor must perform asbestos removal work in accordance with these specifications and EPA National Emissions Standards for Hazardous Air Pollutants (NESHAPs) for asbestos and any subsequent updates thereto. This includes state and EPA Region 3 notifications that shall be accomplished at least 20 days prior to starting any asbestos abatement or removal. A copy of the notification shall be submitted to the Contracting Officer and Installation Asbestos Program Manager.

#### **1.4.1.3 Asbestos Manifests**

If project requires asbestos removal all asbestos waste manifests shall be signed by DOL/DPW, EMO) prior to removal of such waste from the base. A copy of the completed manifest (signed by the receiving landfill) shall be submitted to DOL/DPW, EMO within 10 days of removal of the waste from the Installation.

### **1.4.2 Lead Based Paint Presence**

If lead based paint not previously known to exist is exposed, the Contractor shall cease work in the affected area and notify the Contracting Officer.

#### **1.4.2.1 Lead Renovation/Abatement Plan**

If project requires lead based paint renovation, removal, abatement, the Contractor will submit work plans to include, but not limited to, the following elements: (a) location, quantity and description of how abatement / renovation is to be accomplished; (b) required notifications and schedule Contractor will use to comply with notification deadlines, requirements; (c) Contractor's and subcontractor's current licensing, certifications, fit test, safe work practices, safety requirement and air sampling; and (d) drawings of the locations of negative air machines, decontamination units, and hazardous waste



containers. As soon as practicable, Contractor will submit final wipe sample results to the USACE Contracting Officer for forwarding to DPW-EMO. Upon review of final wipe sample results, DPW-EMO will notify the USACE COR whereupon the Contractor will receive formal communication originated by DPW-EMO that sample results meet the applicable performance standards prior to containment teardown for work area re-occupancy.

#### **1.4.2.2 Lead Based Paint Disposal**

Lead contaminated debris must be sampled to determine the level of lead. Lead paint waste and lead contaminated debris must be sampled to determine the level of lead. DWPL-EMO will inform the Contractor on management procedures. If wastes are determined to be hazardous by regulatory criteria, the containers cannot leave the installation until a completed manifest is reviewed and signed by DOL/DPW, EMO. If the contractor knows a quantity of hazardous waste will be generated he must arrange to have that material removed from the installation within 72 hours of generation. If this cannot be accomplished, the Contractor must contact the Hazardous Wastes Manager to store full drums of lead contaminated waste at the site for less than 90 day, if necessary. The drums must be in good condition, labeled properly and closed. Storage of contractor containers will only be provided on an emergency basis.

### **1.5 AIR QUALITY**

#### **1.5.1 Pollutant Emitting Equipment**

To assure the submittals for pollutants-emitting equipment meets the EMO's air quality reporting requirements, the Contractor shall submit the following information in the following 3 phases. Only pollutant-emitting equipment for which USAG-Fort Lee assumes full ownership and complete guiding, managing, and regulatory control will be included in USAG-Fort Lee's Air Permit. Should USAG-Fort Lee assume full ownership and complete guiding, managing, and regulatory control, the following three-phased approach regarding equipment addition shall be followed.

The following equipment would be required for inclusion in the Three-Phased Approach:

- Gas Fired Heating Equipment
- Fuel Fired Domestic Water Heaters
- Indoor, Direct Gas-Fired Heating and Ventilating Units
- Unit Heaters (if changed to fuel-burning from electric)
- Any other equipment that emits pollutants.

DOL/DPW-EMO is required to have and submit supporting documentation to regulators verifying equipment specifications and emissions (e.g. manufacturer's stack testing / emissions certifications / not to exceed emissions data). Accordingly, ensure submittal of this manufacturer's information to DOL/DPW-EMO Air Quality Program for each piece of equipment per the Three-Phased Approach (except engine testing equipment). For copies of the Three-Phased Approach, speak with your USACE PM or call 804-734-5061. Information to be sent to Air Quality Program @ 804-734-5061 [phone] or [andrew.duggan@us.army.mil](mailto:andrew.duggan@us.army.mil) or arrangements can be made to pick up the information at the site.

If there is uncertainty as to the ownership or operational control assignment of pollutant-emitting equipment, contact the -EMO Air Quality Program for guidance.

Phase 1 - Prior to ordering equipment, the Contractor shall provide the information required in Attachment 6. The data reported will be estimated if actual data is unavailable and so noted with an asterisk. If the information is to be determined it will be entered as "TBD".

Phase 2 - Prior to equipment delivery, the Contractor shall provide all of the information in Attachment 6. The data reported shall be actual data; no estimated data will be accepted in this phase. Submit supporting documentation verifying rated capacity and emissions rates (e.g. manufacturer's stack testing/emissions certifications/not to exceed emissions data) to DOL/DPW-EPO Air Quality Program for each fuel burning piece of Equipment. Contact the EMO Air Quality Program Manager to make arrangements to deliver information.

Phase 3 - Prior to Equipment Startup, the Contractor shall include as part of his schedule the following notifications to the Contracting Officer:

1. 5 day notification prior to the date that equipment is installed.
2. 45 day notification prior to the date the Contractor anticipates starting the equipment
3. 5 day notification prior to the date the equipment is actually started.

### **1.5.2 Volatile Organic Compounds**

All coatings and solvents used in the performance of this contract shall meet the required performance specifications and shall not exceed the volatile organic compound limits of the Air Pollution Control Districts where they are used.

### **1.5.3 VOC Work Practice Standards**

Volatile organic compounds shall not be intentionally spilled, discarded in sewers, or stored in open containers, or handled in any other manner that would result in evaporation beyond that consistent with air pollution practices for minimizing emissions.

If the contractor anticipates a significant amount of the material is to be used during the course of the project, the contractor shall maintain Material Safety Data Sheets (MSDS) or other vendor information showing VOC content of each resin, catalyst, solvent, cleaning solution or other substance used.

### **1.5.4 Solvent Use**

Depending on the type of solvent cleaning equipment, Fort Lee will be subject to 9 VAC 5-40-3260 (Rule 4-24), Emission Standards for Solvent Metal Cleaning Operations Using Non-Halogenated Solvents. As part of an effective ozone control strategy, operations that use solvents (e.g., hand wiping, immersion, or vapor degreasing for surface cleaning, paint clean up, and general maintenance activities) should employ pollution prevention measures such as use of non- or low-VOC content solvents. As well, HAP emissions can be reduced by substituting very low HAP (less than five percent) or HAP-free exempt products. A HAP-free water reducible product should be used for cleaning paint guns and lines. Notably, the decision and authority to use an alternative product must follow the appropriate implementation route. Although methyl ethyl ketone (MEK) was recently delisted as HAP, it is not to be considered a viable alternative solvent. ODC solvents shall not be used without the approval of the Environmental Support Office of the Assistant Secretary of the Army (Acquisition, Logistics and Technology). Solvent Distillers should be used wherever possible to reduce solvent materials by reusing the solvent.

### **1.5.5 Fugitive Dust Emissions Control**

Contractor shall not cause or permit any materials or property to be handled, transported, stored, used, constructed, altered, repaired or demolished without taking reasonable

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precautions to prevent particulate matter from becoming airborne. Such reasonable precautions include, but are not limited to, the following:

- a. Use, where possible, of water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, the grading of roads or the clearing of land.
- b. Application of asphalt, water, or suitable chemicals on dirt roads, materials stockpiles and other surfaces which may create airborne dust or the paving of roadways and maintaining them in a clean condition.
- c. Installation and use of hoods, fans and fabric filters to enclose and vent the handling of dusty materials. Adequate containment methods shall be employed during sandblasting or other similar operations.
- d. Open equipment for conveying or transporting materials likely to create objectionable air pollution when airborne shall be covered or treated in an equally effective manner at all times when in motion.
- e. The prompt removal of spilled or tracked dirt or other materials from paved streets and of dried sediments resulting from soil erosion. (9 VAC 5-40-90)

#### **1.5.6 Boilers/Generators/Miscellaneous Emissions Units**

The contractor shall provide the following information regarding boilers, generators and other miscellaneous emissions units that would fall under the phased approach described in Section 1.5.1; including, but not limited to, woodworking operations, pars washers, brass deformer/recycler, light sets, above-ground storage tanks, underground storage tanks, landfills, blasting operations, x-ray operations, multiple pumps, engine test cells and other proposed operations.

- a. Equipment Manufacturer, Type, and Model Number
- b. Date of Manufacturer
- c. Fuel type (natural gas / distillate oil / dual-fuel)
- d. Output Brake Horsepower (in BHP)
- e. Heat Input / Output (btu/hr or mmbtu/hr)
- f. Manufacturer-Specific Emission Factors (if available)
- g. Low NOx Manufacturer Support Documentation (if applicable)
- h. Anticipated Operating Schedule (broken down by annual quarters in percentage format; put EMERG if to be used as only an emergency generator)
- i. Name, Address, Phone Number, Facsimile Number, Position Title of Point-of-Contact and Responsible Official as defined by 9 VAC 5-80-60.C.
- j. Other relevant activity, emission rate information if miscellaneous emissions unit

#### **1.5.7 Hot Water/Steam Boilers and/or Water Heaters, Furnaces/Make-Up Air Units/Unit Heaters/Roof top Units**

Emission control requirements refer to Section 1.5.1 for the three-phased approach for adding this equipment: These units shall be fired with natural gas, and when necessary with No.2 fuel oil as a back-up fuel, and designed to be high efficiency units. They shall be equipped with a low nitrogen oxide (NOx) burner system for guaranteed NOx performance when using natural gas at no greater than 30 parts per million (ppm), dry volume basis and corrected to 3% excess oxygen (O2).

The contractor shall provide the following information regarding boilers:

- a. Equipment Manufacturer, Type, and Model Number
- b. Date of Manufacturer

- c. Fuel type (natural gas / distillate oil / dual-fuel)
- d. Maximum Rated Input Heat Capacity and Output Capacity (in mmbtu/hr)
- e. Output Brake Horsepower (in BHP)
- f. Electrical Power (kW)
- g. Steam Quantity (in lb/hr)
- h. Vent Stack Configuration, Height, Velocity
- i. Manufacturer-Specific Emission Factors (if available)
- j. Low NOx Manufacturer Support Documentation (if applicable)
- k. Anticipated Operating Schedule (broken down by annual quarters in percentage format)
- k. Name, Address, Phone Number, Facsimile Number, Position Title of Point-of-Contact and Responsible Official as defined by 9 VAC 5-80-60.C.

Burner, boiler/water heater, and low NOx system shall be manufactured as a package by a single manufacturer. Only low NOx (less than 30ppm) fuel-burning heating and water heating equipment shall be installed. The unit's nameplate shall include the approved Underwriter's Laboratory (UL) low NOx model designation. The manufacturer shall provide the customer with a copy of the most recent stack testing results to demonstrate compliance with the 30ppm NOx guarantee. Test results shall be submitted to Air Quality Program @ [andrew.duggan@us.army.mil](mailto:andrew.duggan@us.army.mil). After boiler installation is completed, the manufacturer shall provide the services of a field representative for starting the unit and training the operator(s) at no additional cost. A factory-approved and authorized start-up report shall be submitted to the customer at the time of start-up.

When steam generating units are used, install steam generating units that are less than 10 million British thermal units per hour.

### **1.5.8 Emergency/Non-Emergency Generators**

#### **1.5.8.1 Emission control requirements**

Standards for exhaust emissions from stationary diesel generator sets used for back-up emergency power, peaking power, and other on-site power generation applications shall adhere to the following standards.

No CI ICE shall be installed at USAG-Fort Lee that is unable to demonstrate compliance with the tiered emission limits set forth by NSPS Subpart IIII corresponding to either the actual year of physical installation or a year subsequent to the actual year of physical installation, unless the emission standards for a previous model year are equivalent in magnitude. This requirement applies to emergency, non-emergency (including peak-shaving), or any combination thereof regardless of the following: project gained approval by the permitting authority, controlling entity assignment, percentages of output agreements, pattern of ownership agreements, status as mobile/stationary source, or any contractual language that proposes circumvention of this requirement.

##### **1.5.8.1.1 Tier 2 Emission Standards**

Regardless of the engine's power, all air emission sources whose construction, modification, or reconstruction commenced after July 11, 2005 shall be in accordance with 40 CFR 60, Subpart IIII, and be certified to Tier 2 emission standards for all projects commenced after July 1, 2005.

##### **1.5.8.1.2 Tier 4 Emission Standards**

Regardless of the engine's power, all air emission sources whose construction, modification, or reconstruction commenced after January 2011 shall be in

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accordance with 40 CFR 60, Subpart IIII, and be certified to Tier 4 emission standards regardless of model year of the engine.

#### **1.5.8.2 Fuel Requirements**

As of 1 October 2007, diesel stationary engines must use diesel fuel with a maximum sulfur content of 500 parts per million (ppm).

Beginning 1 October 2010, diesel stationary engines with a displacement of less than 30 liters per cylinder must use diesel fuel with a maximum sulfur content of 15 parts per million (ppm).

#### **1.5.9 Pollutant Emitting Equipment/Vehicles**

All pollutant emitting equipment shall operate in strict accordance with Virginia Regulation 9VAC 5-40-5670 PART II Emission Standards, ARTICLE 41 "Emission Standards For Mobile Sources (Rule 4-41)".

In the event a unit fails to meet these criteria, the operator must shutdown the unit immediately and in a manner that ensures safety; the operator must perform repairs or replace the unit with a unit that can be operated in a manner that adheres to this regulation.

#### **1.5.10 Ozone Depleting Substances (ODS)**

The contract shall comply with the USEPA regulations issued under Sections 601-607 of the Clean Air Act pertaining to ODS.

The contractor shall not employ or provide Class I ODS on Ft. Lee, Virginia. Contracts may not include any specification, standard, drawing, or other document that requires the use of a Class I ODS in the design, manufacture, test, operation or maintenance of any system, subsystem, item, component, or process. Contracts may not require the delivery of any items of supply that contains a Class I ODS or any service that includes the use of a Class I ODS.

#### **1.5.11 Open Burning**

Open Burning is not permitted on Fort Lee property.

#### **1.5.12 Asphalt Cutbacks**

Use of asphalt cutbacks is not permitted on Fort Lee property.

## **1.6 WATER QUALITY**

### **1.6.1 Erosion and Sediment Control Plan**

All land disturbing activities must comply with the Virginia Erosion & Sediment Control Law and Regulations, Virginia Stormwater Management Act and Regulations, Virginia Stormwater Management Program General Permit, and the Chesapeake Bay Act and Regulations.

Plans must be prepared in accordance to the Virginia Erosion & Sediment Control Handbook and the Virginia Stormwater Management Handbook, Volumes I and II.

All Erosion & Sediment Plans and Stormwater Management Plans must be reviewed by a Department of Conservation and Recreation (DCR) Certified Plan Reviewer to ensure compliance with the State Laws and Regulations and the Fort Lee MS4 Permit.

Prior to beginning land disturbing activities, applicable DCR permit authorization must be received and copies provided to the Corps. Also the following list of items is typically required:

- Permit application
- Permit fees
- Calculations
- Certified reviewed plans
- Responsible Land Disturber (RLD) Certification
- The Plan Reviewers Certification
- Provide two copies of each of items 1-6 above to the Corps of Engineers (the Corps will then submit one set to EMO)."

### **1.6.2 Stormwater Permit**

Contractor shall prepare a stormwater design and Stormwater Pollution Prevention Plan (SWP3) in accordance with the requirements of the Virginia Stormwater Management Law (Title 10.1, Chapter 6, Article 1.1) and the Virginia Stormwater Management Regulations (4VAC3-20). The entire Stormwater Management Handbook may be found at: [http://www.dcr.virginia.gov/soil\\_&\\_water/stormwat.shtml](http://www.dcr.virginia.gov/soil_&_water/stormwat.shtml)).

All stormwater management actions must conform to standards outlined in Fort Lee's integrated SWP3. Sufficient rationale must be provided for any deviations from these standards. Fort Lee's Integrated SWP3 may be obtained from the DOL/DPW EMO Stormwater Program Manager at 804-734-3772/5352.

For land disturbing activities one acre or larger in size (2500 square feet or larger in an area covered by the Chesapeake Bay Preservation Act), the contractor shall apply to the Virginia Department of Conservation and Recreation (DCR) for coverage under the Construction General Permit. The contractor shall be responsible for all fees associated with obtaining General Permit coverage. The contractor shall provide a postmarked copy of the submitted DCR stormwater permit application, to include stormwater design and SWP3, to the Contracting Officer and DOL/DPW EMO within 2 days of submission to DCR. Prior to commencement of land disturbing activities, the contractor shall provide evidence of coverage by submitting a copy of DCR coverage letter under the Construction General Permit to the Contracting Officer and DOL/DPW EMO.

#### **1.6.2.1 Oil-Water Separators**

For maintenance and service areas where a floor drain is required, all such drains shall discharge to an appropriately-sized and designed gravity oil-water separator. No coalescing

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media will be allowed. Separator shall discharge treated effluent to the sanitary sewer system, unless no sewer service is proved to the facility.

Oil-water separator shall be located such that it provides convenient access to waste oil recycler truck. Drains, such as those at wash racks, which are exposed to rainwater, shall be bermed to prevent the entrance of storm water, and either covered with a canopy or provided with a system to divert storm water to the storm sewer system after the first flush of storm water is treated by the oil-water separator."

### **1.6.3 Wetlands Protection**

The Contractor shall not enter, disturb, destroy, or allow discharge of contaminants into any wetlands or Resource Protection Areas as defined by the Chesapeake Bay Preservation Act of 1988.

No land disturbance shall occur within 100 ft of existing wetlands or stream channels as defined by the Chesapeake Bay Preservation Act. This 100 ft buffer is referred to as the Resource Protection Area (RPA) and is shown on all environmental constraints maps as provided by Fort Lee Environmental Management Office.

All Best Management Practices (BMP's) must be shown on the Sediment & Erosion Control drawings or the Detail drawings. A Responsible Land Disturber (RLD) shall be on site for all ground disturbance activity and must have an original current validated certificate on site and received by Environmental Management Office (EMO).

## **1.7 HAZARDOUS MATERIALS MANAGEMENT**

### **1.7.1 Hazardous Materials Usage and Reporting**

All contractors are required to report the usage of all hazardous materials to the government for all projects and contracts including service contracts executed on Fort Lee. In accordance with FAR Clause 52.223-3, each offeror (Contractor) must provide the Contracting Office with a list of proposed HAZMAT that it plans to use on the installation during the performance of the contract and must provide copies of all MSDS's to the HMCC (Hazardous Material Control Center). Prior to bringing any HAZMAT on to Fort Lee, a detailed summary of the HAZMAT must be provided to the HMCC (see Attachment 2).

Spills and/or releases of hazardous materials must be reported immediately to the Contracting Officer, Fort Lee Fire and Emergency Services and the Environmental Management Office (EMO).

Hazardous materials are any substance defined by OSHA as a hazardous substance requiring a Material Safety Data Sheet (MSDS). Hazardous materials that need to be reported include but are not limited to chemicals, paints, thinners, sealing compounds, strippers, glues, solvents, all petroleum products including oils, hydraulic fluids, and fuels stored on-site (fuels in vehicles are exempt), pesticides, adhesives, acids, flammables, corrosives, oxidizers, compressed gases (such as but not limited to oxygen, acetylene, propane, flammable and non-flammable gases), all aerosols, and all materials containing hazardous substances.

### **1.7.2 Hazardous Materials Management Program (HMMP)**

No contractor (including sub-contractors) shall bring hazardous materials onto Fort Lee without coordination with the HMCC.

The Fort Lee HMMC will notify the project manager and the Contracting Officer (CO) if extremely hazardous materials are being used by the contractor. The contractor shall not bring any extremely hazardous chemicals on Fort Lee without prior approval from the HMMC.

Contractors are not allowed to have more than a 14-day supply of HAZMAT on the installation at any time. A monthly account of HAZMAT used must be provided to the Contracting Officer and the HMCC for tracking purposes (see Attachment 3). A final report must be submitted to the KO and HMCC upon project completion. Contractors must ensure that any unused HAZMAT is removed from the installation prior to final inspection and project completion.

If it is determined at any time that hazardous materials are on site that were not reported in advance, the CO will be notified and the project may be stopped until the materials are submitted as stated above.

### **1.7.3 Hazardous Material Storage**

Hazardous materials shall be managed properly at all times while on Fort Lee. Containers must be in good condition and properly labeled with the contents and hazard class (flammable, corrosive, oxidizer, etc) at all times. Containers will be closed at all times when not in use, hazardous materials will be kept under cover to protect them from the elements and to prevent stormwater runoff contamination, and tanks and 55-gallon liquid drums will have secondary containment. Gas cylinders will be maintained in the upright position with caps on and will be secured with chains and locks to prevent tampering and to prevent them from falling over. Gas storage areas will have signs indicating what type gases are stored in the area (i.e., flammable, oxidizer, non-flammable, etc). NO SMOKING signs will be posted in all hazardous materials storage areas. In addition, all hazardous materials will be segregated in storage according to compatibility (i.e. flammables will not be stored with corrosives, corrosives will not be stored with oxidizers, flammable gases will not be stored with flammable liquids, etc). Fort Lee is subject to inspections at any time from outside agencies (EPA, Virginia Dept of Environmental Quality, and OSHA) and any violations by the contractor will be the responsibility of the contractor and any fines associated with the violations will be resolved at the contractor's expense.

#### **1.7.3.1 Petroleum, Oil, Lubricants (POL) Storage**

Containers 55-gallons or larger must be provided with secondary containment. Double-wall fuel tanks meet secondary containment requirements.

#### **1.7.3.2 Gas Cylinders**

Gas cylinders will be stored in the shade or under cover and maintained in the upright position with caps on and will be secured with chains and locks to prevent tampering and to prevent them from falling over. Gas storage areas shall have signs indicating what type gases are stored in the area (i.e., flammable, oxidizer, non-flammable, etc).

### **1.8 USE OF RECYCLED-CONTENT PRODUCTS: (GREEN PROCUREMENT)**

Whenever the potential for use of non-recycled content products exists during the construction stage of the project, the Contractor shall incorporate in this project, as a substitute, recycled-content products that are listed and identified in the Environmental Protection Agency (EPA) Comprehensive Procurement Guidelines (CPG) for recycled-content products. The Contractor shall use recycled-content products as required by EPA and other governmental agencies and Federal Acquisition Regulation (FAR) clauses.

It is mandated by Executive Order 13423 Strengthening Federal Environmental, Energy and Transportation management, and Section 6002 of the Resource Conservation and Recovery

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Act (RCRA) that the Federal Government use recycled-content products in the construction and/or renovation of facilities. It is the intent of the Government to comply with the Environmental Protection Agency (EPA) requirement 100% of the time and use as many of the applicable listed recycled-content products as feasible and economically practical. The Contractor shall consider this a standard requirement for all aspects of the project construction.

The recycled-content products listed in the CPG can be found in the EPA website at [www.epa.gov/cpg/products.htm](http://www.epa.gov/cpg/products.htm). These products are also listed at Attachment 4 "CONTRACT SUBMITTAL AND CONTRACTOR REPORTING FORM" located at the end of this section. This list is subject to change at any time so it is the Contractor's responsibility to be aware of any updates or additions.

Such products shall also comply with the requirements of the EPA Recovered Materials Advisory Notice (RMAN). The RMANs recommend recycled-content ranges for CPG products based on current information on commercially available recycled-content products. The recommended recovered materials content percentage can be obtained by clicking on the product on the website.

With regard to all project reporting deliverables, reports, preliminary deliverables, draft deliverables, final deliverables, and copies thereof will be printed double-sided on 100% recycled paper with a matte finish. Exceptions include large maps where, because of printer limitations, it is inherently difficult to print double-sided, as well as for some unique presentation materials.

#### **1.8.1 Green Procurement Forms**

Before starting the project, the Contractor shall complete attachment 4 "CONTRACT SUBMITTAL AND CONTRACTOR REPORTING FORM" indicating the items he plans to use. The Contractor will provide this to the Contracting Officer, the project manager, and the EMO Pollution Prevention Manager. During the accomplishment of the project construction, the Contractor shall complete the form again indicating the use and non-use of products that are contained in the CPG and will list the recycled-content percentage for the applicable item. In each instance where a recycled-content construction product is not used, the Contractor shall provide to the Contracting Officer (or his/her designated representative), the project manager, and the EMO Pollution Prevention Manager a completed Exemption Form, attachment 5, "RECOVERED MATERIALS DETERMINATION FORM" located at the end of this section.

The Contractor shall sign the form as the "Procurement Originator" and the completed form shall also be signed by the EMO Pollution Prevention Manager. These forms shall be kept in the project folder indefinitely.

### **1.9 INSTALLATION RESTORATION PROGRAM (IRP) REQUIREMENTS**

#### **1.9.1 Contaminated Soil and Free Product**

Any material (soil) that is suspected of containing petroleum products shall be reported to the Contracting Officer or his/her designated representative. If discovered, the Contractor shall mitigate any potential threat to the workers, public and environment. The area that will be disturbed under this contract has the potential to have free product migrate into and under the construction site. Comply with VR-680 and record the quantity of any fuel removed.

Contaminated soil and/or free product shall not be used for backfill or removed from the base without written approval from the Contracting Officer. Once removal is approved, Contractor shall dispose of material under guidance of the Hazardous Waste Managers. All hazardous waste manifests shall be prepared by the Contractor and shall be coordinated, approved and

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signed by DWPL-EMO Hazardous Waste Manager prior to removal of such waste from the base (804-734-3881/3722).

### **1.9.2 Site Safety**

Ensure workers are informed of potential hazardous exposures from working at IRP sites, and that the appropriate precautions are followed to minimize hazards to human health and the environment. Personnel working at these sites shall have 40-hour HAZWOPER Training. At least one individual on site should have completed the OSHA 8-hour supervisor training course. The plans identify the boundary of applicable IRP sites. To perform work at these sites, the Contractor must have a Health and Safety Plan and Hazardous Waste Disposal Plan for proper disposal of all regulated materials generated during execution of this project.

### **1.9.3 Monitoring Wells**

There may be monitoring wells installed in and around a proposed construction area. Site maps and construction drawings provide the location of these wells. The Contractor shall take all precautions to prevent any damage to wells. If the wells and associated structures are damaged during the project, the Contractor shall repair/replace all damages at no additional expense to the Government. Contractor shall dispose of all regulated materials during repair of the damaged structures and remove any free product as required by VDEQ regulations.

### **1.9.4 Additional Excavation**

Prior to any excavation beyond the immediate area or boundary of the construction site, the Contractor shall coordinate with DOL/DPW, EMO and the Project Manager and obtain the Contracting Officer's approval and may be required to obtain additional digging permits.

## **1.10 SOIL SUPPORT PROGRAM (SSP) ACCEPTABILITY**

The soils obtained from off-base sources shall meet the criteria outlined below.

### **1.10.1 Clean Soil**

Projects requiring clean soil, including but not limited to top soil and backfill materials, to be brought onto Fort Lee or relocated within base property must meet minimum standards based on results of physical (geotechnical) and chemical testing. All materials will meet physical (geotechnical) specifications appropriate for the type of project being accomplished and are typically identified elsewhere in the project specifications. The intent of this section is to prevent contamination from borrowed sources (i.e. planned excavation) and define clean soil based on chemical specifications. Levels of chemical contamination will be determined to ensure borrow soils may be used for the current and future use of the project location. The contractor shall implement a plan and confirm the proposed borrow soils meet clean soil requirements. The plan should incorporate borrow source information, sampling data, and testing results. As a minimum, the following standards must be met.

### **1.10.2 Borrow Source**

The contractor shall provide detailed borrow source information (e.g., location, owner, operator, past and current land use, previous chemical testing results) at the point of planned excavation to the Contracting Officer's Representative, the DOL/DPW, and EMO to determine chemical testing requirements. The contractor shall also submit a certification stating the materials contain no asbestos, no gross contamination have been discerned by visual or olfactory observations, and no spills of a listed hazardous waste (40 CFR 261) have occurred at the borrow site. If previous chemical testing results exist and are provided, DOL/DPW, EMO will

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evaluate those results to determine if they are sufficient and the proposed borrow soils meet clean soil requirements. If testing is incomplete, the COR with assistance from DOL/DPW-EMO, will review borrow source information to determine chemical sample requirements.

#### **1.10.2.1 On-Base Soil Sources**

Unless otherwise provided in the contract, the contractor shall bear all expenses of developing the source. For the site where soil is reclaimed from government land, the contractor may be required to perform final grade and seeding according to project requirements.

#### **1.10.2.2 Excess Soil Work**

Acceptable excess soil shall be delivered to the designated location(s) following approved haul routes. For the site where excess soil is deposited on government land, the contractor may be required to perform final grade and seeding according to project requirements.

#### **1.10.3 Borrow Source Sampling Plan**

At least one composite sample (6-8 grabs) for each undisturbed borrow source would be taken from the original point of excavation and required for each 5,000 CY of soil. For soil taken from disturbed borrow sources, samples are required for each 1,000 CY of soil. The nature of the borrow source is to be considered when determining the quantity and depth of the samples. Additional samples may be required to adequately characterize the proposed borrow source (i.e. laterally and vertically). The contractor shall submit a Sample Plan (to include site map, excavation area, location and depth of samples) for DOL/DPW, EMO review and approval.

#### **1.10.4 Chemical Testing Standards**

The analysis must be performed by a laboratory approved by the U.S. Environmental Protection Agency. Submit a copy of the chain of custody and complete validated report of analysis to DOL/DPW-EMO for review and approval 30-days prior to use of any borrow soils. Chemical testing of any borrow source shall include sampling for the following suite of contaminants (test requirements may be reduced based on borrow source information):

Total Petroleum Hydrocarbons (TPH) to include Gasoline Range Organics (GRO) and Diesel Range Organics (DRO); Volatile Organic Compounds (VOCs) [EPA method 8260B] to include Benzene, Toluene, Ethylbenzene, and Xylene (BTEX);

The soil support test suite shall also include unless generator knowledge suggests otherwise:

1. Semi-volatile Organic Compounds (SVOCs) [EPA method 8270];
2. Pesticides [EPA method 8081A];
3. Polychlorinated Biphenyls (PCBs) [EPA method 8082]; and
4. Target Analyte List (TAL) metals (including Mercury) [EPA method 6010B/7470A]
5. Volatile Organic Compounds (VOCs) [EPA Method 8260] other than BTEX compound reference in the preceding paragraph

#### **1.10.5 Clean Soil Determination**

Soils testing under the EPA screening levels and/or base "background" levels will be considered acceptable "clean" soil. Generally, acceptable clean soil must not exceed EPA Region III "Residential" Risk Based Concentrations (RBC) and the LAFB Upper Tolerance Limit (UTL) background soil concentrations. For use in current and future industrial areas, EPA Region III "Industrial" RBCs may be considered but shall not exceed UTL background levels.

#### **1.10.6 Excavation and Delivery Screening**

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Common to any multiple point sampling, composite testing may not accurately characterize the entire site. Should contamination be detected (e.g. free product, stained soils, chemical odors) during excavation or delivery, soil operations shall be immediately discontinued, the Contracting Officer notified, and remain discontinued pending DOL/DPW, EMO notification, resolution, and approval of the Contracting Officer of the Contractor's plan to eliminate contamination from the work area. Additional soil testing and screening may be required to determine if continued use of the borrow site is acceptable.

### **1.11 PEST MANAGEMENT**

The contractor shall be required to submit a pest management plan to the Installation Pest Management Coordinator (IPMC) before any use of pesticides/herbicides.

All pesticide/herbicide use must be coordinated with IPMC.

The pest management plan must include all the information that is required in the Installation Pest Management Plan, AR 200-5, Fort Lee Policy 17-03, and any other applicable state or federal requirements.

1. Before the application can be scheduled the Contractor must have an approved pest management plan by Fort Lee Environmental Management Office and have an Authorization To Treat Form 316.
2. The Contractor must be on the Fort Lee Pest Contractor approved list, as provided by EMO.
3. The Contractor must use a pesticide from the Fort Lee approved pesticide list.
4. After product is applied submit amount of concentrated quantity applied on DA 1532 or approved format to Fort Lee EMO.

In addition to these requirements, the Contractor must submit in his Pesticide Application Submittal the following Information:

1. Name of the pest company and applicator name with Virginia Approved License in the appropriate category
2. MSDS & Label of Product that is being applied.
3. Area that product will be applied with square footage.
4. Notification to Fort Lee Environmental Management Office at least 48 hours before application date.

### **1.12 Cross Connection Control and Backflow Prevention**

In accordance with Safe Drinking Water Act, Cross Connection Control and Backflow Prevention in Waterworks of the Commonwealth of Virginia, State Board of Health, Waterworks Regulations 1993, as amended and to include all site specific requirements. Domestic water main entering the building shall be provided with a Reduced Pressure backflow preventer. If the backflow is greater than 3 inches, the contract will require the use of a manifold system with the main line utilizing two smaller backflows that will provide the same amount of water with the ability to isolate each one independently for servicing. Additionally, domestic water systems shall be protected from contamination by hydronic water systems and other HVAC systems via a Reduced Pressure backflow preventer and any mechanical equipment that may potentially contaminate the public water system.

### **1.13 INADVERTENT DISCOVERY OF ARCHAEOLOGICAL ARTIFACTS**

#### **1.13.1 Overview:**

---

This procedure covers all situations when a survey has been conducted, and deeply buried archaeological deposits have not been discovered at that time; however during later construction or other ground disturbances inadvertent archaeological resources are found. Failure to comply with these procedures could result in fines and penalties under 36 CFR §800.

### **1.13.2 Policy:**

Upon inadvertent discovery of archaeological artifacts, the ground disturbing activity must immediately be halted, and the CRM contacted. The requirements of ARPA and NAGPRA will be followed in any excavation of the artifacts.

### **1.13.3 Procedures:**

1. Work will cease in the area of any discovery and the CRM must be notified within 24 hours of the discovery. The CRM and/or archaeologist will visit the site within 24 hours after notification and examine the excavated artifacts, as well as any surrounding deposits. Failure to cease work prior to examination and evaluation subjects Fort Lee to liability under ARPA.
2. The CRM will determine whether the artifacts are covered under NAGPRA; if a positive determination is made, based on whether the material contains human remains, funerary objects, sacred objects, or objects of cultural patrimony, the CRM will implement the procedures set forth in NAGPRA.
3. If the determination by the CRM is that the artifacts are not covered by NAGPRA, the following procedures will be followed:
  - a. If the CRM concludes that the material, although not Native American, is nonetheless human in origin, (s)he will analyze the context, probable age, and significance of the deposit;
  - b. If the CRM concludes that the material is not of human origin, the project will resume;
  - c. Should the artifacts be of human origin, but not related to a burial or other associated artifacts, the CRM will recommend that the project be relocated until the site can be completely evaluated. If this relocation is impossible, the CRM will notify the SHPO regarding the discovery, as set forth in 36 CFR 800.6. Unless the work that threatens the artifacts is of an emergency nature, it must continue to be suspended until the consultation is concluded. If the SHPO and the CRM mutually conclude that the excavated material and surrounding deposit are not eligible for the NRHP, the CRM will summarize the consultation in writing and attach the summary to the site record. The CRM will then advise the project manager that the work may proceed, with the understanding that a qualified archaeologist will continue to monitor the project to make certain that any NHRP eligible material is not endangered.
  - d. If either the CRM or the SHPO concludes that the recovered material cannot lead to a determination of significance because insufficient quantities exist, or the nature of the material does not assist such a determination, they may develop an emergency testing plan for the site. During the implementation of the plan, site activities involving excavation must cease.
  - e. If the CRM and the SHPO determine that the site is eligible for the NRHP, or if they cannot agree on its eligibility, one of the following procedures can be followed:
    - i. The project may be relocated;
    - ii. Fort Lee and the SHPO should conclude an MOA that details further evaluation of the site sufficient to alleviate adverse impacts by the project. If

Fort Lee and the SHPO cannot agree on the extent of further evaluation, they shall request comments from the ACHP;

- iii. Fort Lee may dispense with an MOA if further evaluation of the site will be limited in scope and the SHPO agrees; however, the results of the evaluation shall be documented and communicated to the SHPO;
- iv. Fort Lee may follow NAGPRA and related state and federal laws, if it is believed that human remains may be discovered. In that case, the CRM will consult with the SHPO and affected Native American tribes;
- v. Fort Lee may choose to follow 36 CFR §800.11(b), and use documentation prepared to comply with other laws to fulfill the requirements of the procedures in that section; however, any documentation must meet the standards of the regulation. When using this approach, Fort Lee must also consult with the SHPO and ACHP regarding the actions taken, in accordance with 36 CFR §800.6.

#### **1.13.4 Notification:**

Before projects that could involve excavation are approved, the project manager must be notified of this SOP and, in particular, the requirement to cease work immediately and notify the CRM when archeological artifacts are encountered.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)













DUMPSTER ENCLOSURE



PEDESTRIAN SIDEWALKS & SEATING AREA



**BICYCLE RACKS**

## APPENDIX G GIS Data

Not Used

Section: Appendix H. Exterior Signage

# **Appendix H**

## **Exterior Signage**

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# SIGNAGE DESIGN STANDARDS

## 1.0 SIGNS

**1.0.1** Signs are used to visually communicate information. They are highly visible features that should be attractive and compatible with their surroundings. Careful consideration must be given to what a sign says, how it is said, its visual appearance and organization, its location, structural support system, and relation to other signs within the installation. Standardized signage systems facilitate movement, provide a sense of orientation, and reinforce standards of excellence. Signage creates a unifying element throughout the installation that visually ties the installation themes together and builds a reference and continuity that translates into confidence and reassurance when traveling throughout the installation. The standards to apply for signage color, type, and sizing is found in Technical Manual (TM) 5-807-10, *Signage*.

**1.0.2** Sign System Characteristics. There are several basic design characteristics that, by serving to convey necessary information clearly and attractively, are an integral part of any successful signage system.

**1.0.2.1** Simplicity. An effective strategy provides only needed information, avoids redundancy, and eliminates over-signing with resultant clutter and visual confusion. Sign messages must be clear, simple, and easy for motorists to process quickly.

**1.0.2.2** Continuity. It is essential that the system be applied uniformly and consistently throughout the entire installation. The importance of consistent implementation extends from the larger issues of sign type and size down to accurate color continuity and matching typestyles.

**1.0.2.3** Visibility. Sign location is a very important ingredient within the system. Signs must be located at significant decision points and oriented to provide



clear sight lines for the intended user. Close coordination of locations with respect to landscaping, utilities, adjacent signage, and various other street design elements is important to ensure long-term maximum visibility.

1.0.2.4 Legibility. Sign typestyle, line spacing, color, and size all combine to create the crucial design characteristics of legibility. This aspect of sign design should take into consideration users such as motorist, pedestrians, or bicyclists, and the relative travel speed at which each type of user will be traveling when viewing the signs.

### 1.0.3 Vocabulary-Communications

1.0.3.1 A common language has been created for establishing a signing system. The different components that create the sign package have been named and referred to within the total signing system.

1.0.3.2 The creation of a "signing language" helps generate a unified bond within sign types that make up a signing family.

- Reference
  - Information/Message
  - Presentation
  - Architectural Influence
  - Graphic Architecture

### 1.0.4 Visual Hierarchy (Fig. 1.1)

11.4.4.1 The entire signing system must communicate, through a range of sign and typestyle sizes, the relative importance of the individual activity that the sign identifies. The system should follow a logical progression from a point of origin to the desired destination.

1.0.4.2 A stated ranking method supports the visual standard of hierarchy within the signing system. Signs can be organized within assigned classes with

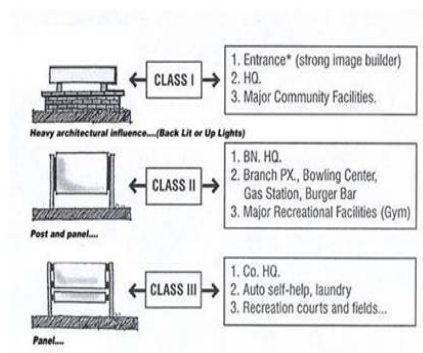


Fig. 1.1 - Signs can be organized into classes within the visual hierarchy.

emphasis on the function and image of the installation.

1.0.4.3 Within each class, the level of architectural influence evokes the importance of the sign to the installation. This is also critical to the idea of progression. The importance of a sign must be presented in its size and level of detail.

1.0.4.4 As individuals move closer to their destination on the installation, the scale of the sign becomes progressively smaller and the level of the message more detailed.

## 1.0.5 Types of Signs

### 1.0.5.1 Information / Identification Signs (Fig. 1.2).

These are signs that identify entrances to the installation, areas within the installation, major tenants, buildings, and organizational or functional components. They identify a location, and greet the visitor to that location. They should be compatible in scale and character with the architecture and also blend with the natural surroundings. These signs are designed to include the following:

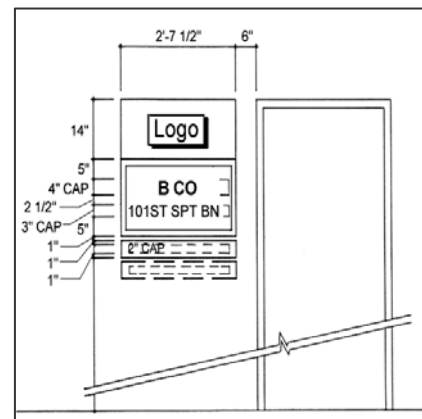


Fig. 1.2 - Building mounted information sign.

1.0.5.1.1 Typeface: Lettering is self-adhesive backing material.

- Building Title: Helvetica Medium, Upper and lower case
- Building Numbers: Helvetica regular
- Building Addresses: Helvetica Medium, Upper and lower case

1.0.5.1.2 Color:

- Panel: Dark Brown
- Lettering: Cream
- Post: Dark Brown

- Exposed panel backs and edges: Dark Brown
- All paint: Semi gloss

#### 1.0.5.1.3 Materials:

- Panel: Double-face 1/8-inch thick aluminum
- Post: Steel Pipe
- Foundation: Concrete pier or direct burial

#### 1.0.5.1.4 Building Identification.

1.0.5.1.4.1 Street Addresses. The addressing procedures prescribed in DoD 4525.8-M, DoD Official Mail Manual are mandatory for use by all DoD components. (Fig. 1.3) DoD 4525.8-M, Chapter 3 prescribes the following:

All DoD address shall be assigned so they are compatible with the U.S. Postal Services automated delivery point sequencing (C3.3).

The DoD installation is responsible for assigning city-style, street address on the installation (C3.3.2.2).

Street addresses shall be assigned and used even though a DoD activity may deliver the mail to the addressee (C3.3.2.2.1) (Fig. 1.4).

Only geographically locatable civilian-style street address (such as 4102 Cindy Avenue) shall be used (C3.3.2.2.4).

Installations shall not use one street address for the entire installation and then use secondary unit designators such as "Building 123" to designate the delivery addresses on the installation (C3.3.2.2.5).

Addresses such as "Building 123 Roberts Street" are not a valid address format and shall not be used (C3.3.2.2.6).



Fig. 1.3 - Use Street addresses on all building identification signs.



Fig. 1.4 - Bronze anodized metal sign at CASCOM.

#### 1.0.5.1.4.2 Address Placement.

Place addresses by the front entrance of the building so they can be seen (C3.3.2.3.1).

Fort Lee buildings have the building number on the corner of the building structure.

Building identification signs will use street addresses.

Buildings without identification signs shall have the address number and street name centered above the main entrance or located to the right side.

#### 1.0.5.1.5 Housing Areas.

1.0.5.1.5.1 The sign should be complimentary to the architectural setting of the housing area and approved by the installation Real Property Planning Board (Fig. 1.5).

1.0.5.1.5.2 Housing numbers should be placed on the house where lighting will effectively light the numbering.

#### 1.0.5.1.6 Installation Identification Signs.

1.0.5.1.6.1 Installation identification signs name the installation and display the official US Army plaque. The designation "United States Army" must appear at the top of the sign in accordance with AR 420-70, para 2-7h. Every installation entrance shall have an installation identification sign displaying only the US Army plaque, with the words "United States Army, Fort (Name of Fort), and gate name as indicated in "Figure 1.7 - Installation Entrance Signs". The placement of Senior Mission Commander logo, unit crest, and other installation identification signs, monuments, or displays shall be located inside the installation beyond the cleared area of the Access Control Point (ACP) of entry. When used service-wide, these signs convey a uniform image of strength and stability to the public. Emblems, branch colors, unit mottos, names, and titles of individuals are not to be displayed (Fig. 1.6).



Fig. 1.5 - Brick sign at Jackson Circle.



Fig. 1.6 - Fort Lee Installation Entrance Sign.

1.0.5.1.6.2 Installation identification signs consist of three types:

- Sign type A1, main entrance sign, identifies the principal visitor entrance (Fig. 1.7).
- Sign type A2, secondary entrance sign, identifies entry points with relatively high volumes of visitor traffic.
- Sign type A3, limited access entry gate signs, identifies entry points with limited public access.

1.0.5.1.6.3 See Technical Manual (TM) 5-807-10, Signage, paragraph 3-3, for sign specifications and paragraph 3-11 for sign placement guidelines.

- Identification signs are those that state the name of the building or facility at that location. Permanent signs are installed at permanent buildings.
- Directional signs point the way to a destination with an arrow (Fig. 1.8).
- Directory signs are those that list a series of destinations within a building or in an area of the post, and may serve as secondary information to an identification sign (Fig. 1.9).
- Informational signs convey other general messages such as schedules, policies or regulations.
- Mandatory signs carry imperative regulatory messages such as warnings and restrictions; and, must have prior approval from DOL/DPW Traffic Review Board.
- Regulatory signs are to be accomplished by DOL/DPW only. Overhead Passage signs are to be accomplished by DOL/DPW only



Fig. 1.7 - Building sign at Fort Lee.



Fig. 1.8 - Typical Directional Signage at Fort Lee.

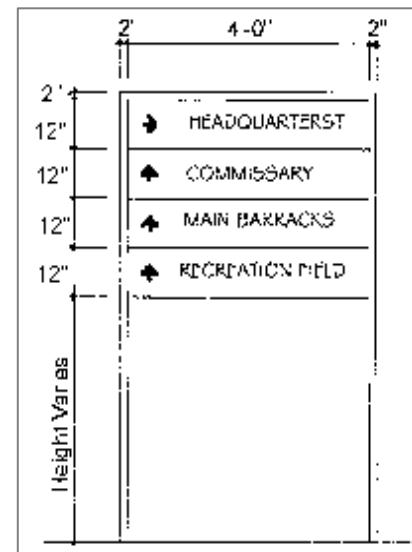


Fig. 1.9 - Direction Sign with Arrows on Left Side Only.

- Motivational signs are those that carry inspirational slogans to support training and morale; and, except for 'Army Values' signs, display is limited to 30 days.

#### 1.0.5.1.7 Street Signs.

Street name identification signs should be designed with the same lettering, color, and materials as other information signs.

#### 1.0.5.1.8 Wheeled/ Hobo Electrical Signs.

Wheeled electrical signs will have an attractive presentation. Temporary landscape elements should not be used whenever possible. The siting of this type of sign will be approved by the RPPB. This type of sign should not be used or used longer than six (6) months. After which time, the sign will be removed or turned into a permanent sign.



Table 1.1 Sign Matrix

Type of Message Required ● Permitted ○ Permitted on Secondary Sign Board Only	Identification	Directional Signs	Directory Signs	Informational Signs	Mandatory/Prohibitory Signs	Motivational Signs
Type of Sign (DC 6.2):						
A1	●					
A2	●					
A3	●					
A4	●					
B1	●	○	○			
B2	●	○	○	●	●	●
B3		●	●			
B4		●	●			
B5	●					
B6	●			●	●	
B7						●
B8					●	●
B9	●				●	
B10		●		●	●	
C1	●					
C2	●					

#### 1.0.5.1.9 Directional Signs.

These signs guide the motorist or pedestrian in, around, and out of the installation. The legibility and placement of these signs, as well as the ordering of information, is critical to their effectiveness. These signs should be placed in central locations and at major decision points along circulation routes. These signs are designed to include the following:

**1.0.5.1.9.1 Typeface:** Lettering is self-adhesive backing material.

##### 1.0.5.1.9.2 Arrow:

- Place at end indicating direction (Fig. 1.10).
- Stroke width: Helvetica Medium cap
- Fort Lee prefers that the arrow be placed on the left side of the sign.

##### 1.0.5.1.9.3 Color:

- Panel: Dark Brown
- Lettering: White
- Post: Dark Brown
- Exposed panel backs and edges: Dark Brown
- All paint: Semi gloss

##### 1.0.5.1.9.4 Materials:

- Panel: Double-face 1/8" thick aluminum
- Post: Steel Pipe
- Foundation: Concrete pier or direct burial

#### 1.0.5.1.10 Regulatory Signs.

These signs provide the rules for travel and parking on the installation. They include speed signs, turning

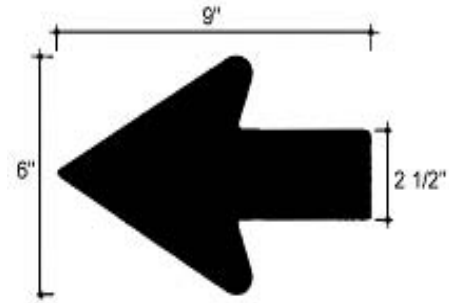


Fig. 1.10 - Typical Arrow For Use On All Destination Signs.



and lane use signs, warning signs, parking control signs, etc. Related to these signs are pavement markings and traffic signals. These signs are designed to include the following (Fig. 1.11):

1.0.5.1.10.1 Typeface: Lettering is self-adhesive backing material.

- Helvetica Medium upper and lower case

1.0.5.1.10.2 Color:

- Panel: Dark Brown
- Lettering: White
- Post: Dark Brown
- Exposed panel backs and edges: Dark Brown
- All paint: Semi gloss

1.0.5.1.10.3 Materials:

- Panel: Double-face 1/8" thick aluminum
- Post: Steel Pipe
- Foundation: Concrete pier or direct burial

1.0.5.1.11 Traffic Control Signs.

1.0.5.1.11.1 CONUS Installations. National highway standards will be used for signs to regulate vehicular traffic on CONUS installation (AR 420-72, Transportation Infrastructure and Dams, Para 2-15f). These standards are described in the Manual of Uniform Traffic Control Devices (MUTCD). Also see MTMC Pamphlet 55-14, Traffic Engineering for Better Signs and Markings. This pamphlet clarifies existing standards and provides definite guidelines for installation officials to conform to the MUTCD. These standards shall be used installation wide to include installation Access Control Points (Fig. 1.12).

1.0.5.1.11.2 OCONUS Installations. OCONUS installation streets and roads are to be considered

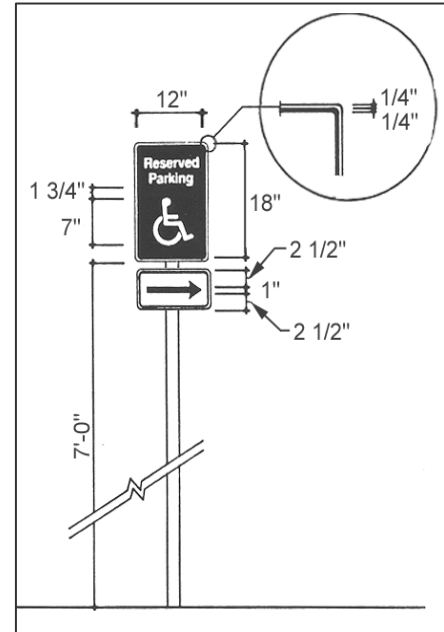


Fig. 1.11 - Regulatory Sign.

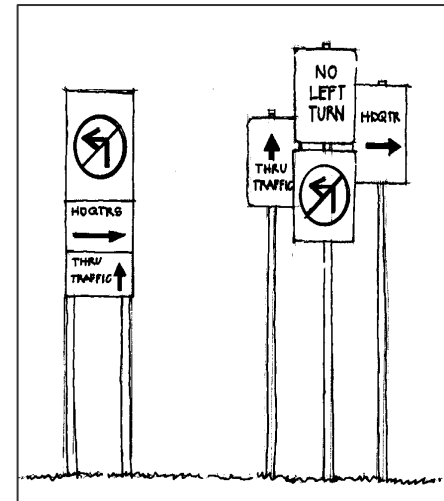


Fig. 1.12 - Sign should be Simple, Legible, and Combined.

extensions of the road system of the host nation and shall use traffic control device standards and criteria of the host nation (AR 420-72, Transportation Infrastructure and Dams, Para 2-15e).

**1.0.5.1.11.3 Prohibitory (Warning) Signs.** This category of signage is intended to maintain security and safety on the installation perimeter and at other specific secure areas. These signs notify visitors of restrictions, as well as other security procedures. The guidelines for design, fabrication, and placement of warning signs are found in Technical Manual (TM) 5-807-10, Signage, para 3-9.

#### 1.0.5.1.12 Electronic Exterior Signs

All exterior flashing signs, traveling lights, or signs animated by lights of changing degrees of intensity or color are prohibited.

### 1.0.6 Sign Placement

Placement of signs differs according to the type of sign and the specific site constraints. The following guidelines apply to placement of the majority of signs.

Do not place more than one sign at any location. Traffic rules are the exception to this rule.

Place signs in areas free of visual clutter and landscape materials.

Place signs in locations that allow enough time for the user to read and react to the message (Fig. 1.13).

Signs should not be placed to block sight lines at intersections.

Place signs approximately 1.2 meters (4 feet) above ground level to be within 10 degrees the driver's line of vision. Provide proper placement to avoid a hazard to children.

### 1.0.7 Sign System Typography

**1.0.7.1 Military Emblems.** The Army has a rich tradition of military heraldry. Military emblems are an important part of the soldiers' identity and the

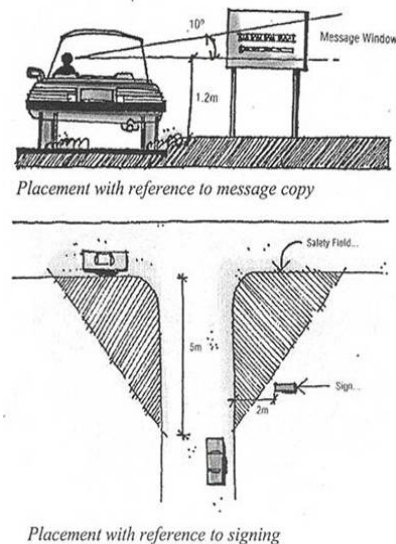


Fig. 1.13 - Placement Is Critical To Ensure Easy Readability.

emblems have been carefully crafted over the years to express unit pride and unique history and function of the unit. The care and use of organizational emblems in a signage system can add visual interest as well as build pride and a sense of history. However, the overuse of miscellaneous emblems can lead to clutter and a dilution of their importance. Colors for military emblems must be in accordance with the Institute of Heraldry.

**1.0.7.2 Department of the Army Plaque.** The plaque should be displayed on installation identification signage to emphasize the heritage and professionalism of the United States Army. The design of the plaque must be in accordance with Army Regulation (AR) 840-1, Department of the Army Seal, and Department of the Army Emblem and Branch of Service Plaques, and must be reproduced in full color.

**1.0.7.3 Insignias.** The use of branch insignia, shoulder sleeve insignia, coat of arms and/or distinctive insignia on headquarters signs is permitted. All military emblems must appear in full color. Motivational symbols or motifs will not be used.

## **1.0.8 Reduce Visual Clutter**

**1.0.8.1** Over-signing detracts from a uniform sign system and if left uncontrolled will eventually destroy the integrity of the system.

**1.0.8.2** Clutter creates confusion and ineffectiveness. Often motorist and pedestrians are confused by the bombardment of messages that have no relationship to each other, or the communication is on such a minimal level that the sign serves no purpose (Fig. 1.14).

## **1.0.9 Location Maps**

**1.0.9.1** The location map is an integral element of an installation entrance. The location map display provides information and sense of place to the viewer. The design and construction should be of compatible architectural materials found throughout the installation (Fig. 1.15).

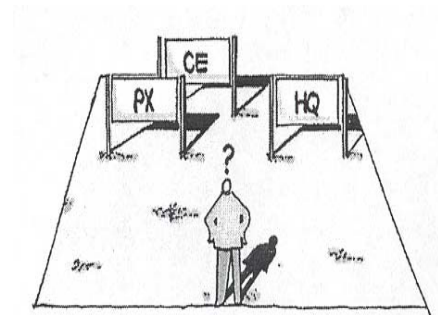


Fig. 1.14 - Visual Clutter Causes Confusion.

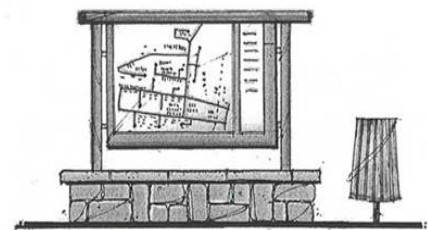


Fig. 1.15 Location Maps Provide a Sense of Place.

1.0.9.2 The location map should contain the following characteristics within the design.

- Plexiglas covered map for protection
- Architectural compatible materials used for the base
- Paved walk-up area
- Litter receptacle
- Provide parking adjacent
- Provide current takeaway maps

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## BUILDING IDENTIFICATION SIGN



EXTERIOR SIGNAGE AT 2100 ADAMS AVENUE, FORT LEE, VA.

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Section: Appendix I. Acceptable Plants List

# **Appendix I**

## **Acceptable Plants List**



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REPLY TO  
ATTENTION OF

**DEPARTMENT OF THE ARMY**  
HEADQUARTERS, UNITED STATES ARMY GARRISON-FORT LEE  
1100 LEE AVENUE SUITE 112  
FORT LEE, VIRGINIA 23801-1720

ATZM-EMO

**FORT LEE POLICY NO. 18-03**  
10 Jun 2003

MEMORANDUM FOR FLOFMAIL/FLOTMAIL

SUBJECT: Minimizing the Introduction and Spread of Invasive Plant and Insect Species on Fort Lee, VA

1. **Purpose.** The purpose of this policy is to establish adequate procedures to reduce the potential introduction and spread of invasive species on Fort Lee, VA.
2. **References.**
  - a. National Invasive Species Act of 1996 (P.L. 104 –332).
  - b. Federal Noxious Weed Act of 1974 (with amendments).
  - c. Executive Order 11987, Exotic Organisms, 24 May 77.
  - d. Executive Order 11312, Invasive Species, 3 Feb 99.
  - e. Invasive Alien Plant Species List of Virginia – Virginia Department of Conservation and Recreation.
3. **Background.** Invasive plants and insects are species that have been introduced into an environment where they did not evolve. As a result, these species usually have no natural enemies to limit their reproduction and spread. These species threaten biodiversity, threatened and endangered species, and the training mission - by rendering portions of training areas unusable. Invasive species have been introduced to Fort Lee by natural migration and through the transportation and planting of nursery stock. It is impossible to completely eradicate these species. It would be cost prohibitive to eliminate these species; however, steps can be taken to minimize the introduction and spread of invasive species.
4. **Policy.** Contracting agents will insert specifications into contracts requiring landscaping vendors to provide nursery stock that is nursery - certified to be free from insects, invasive plants, and their seeds. Contracting agents include all personnel responsible for the procurement of landscaping goods and services who are responsible for the development of scopes of work, performance work statements, etc., or the direct purchase of landscaping materials (i.e., credit card purchases). A standard contract statement is inserted for inclusion in all procurement

ATZM-EMO

SUBJECT: Minimizing the Introduction and Spread of Invasive Plant and Insect Species on Fort Lee, VA

documents (including credit card and purchases). Copies of this certification must accompany shipping manifests of nursery stock and the agent will require copies per the contract prior to the commencement of planting. IMPAC cardholders purchasing landscaping services or nursery stock will also require a copy of the certification from the vendor prior to planting.

a. The Imported Red Fire Ant has been introduced into Virginia from nursery stock transported from Red Fire Ant quarantine states. The U. S. Department of Agriculture has signed compliance agreements with nurseries working in these states. Nursery stock or materials originating from the following states are required to have an Imported Red Fire Ant – free certificate attached to the shipping manifest: Georgia, Florida, North Carolina, Texas, Mississippi, Alabama, Louisiana, South Carolina, Tennessee, Arkansas, and Oklahoma. If the certificate is absent do not accept shipment of these materials.

b. Land management equipment operating in known areas of infestation will be thoroughly cleaned at a designated washdown site prior to relocating to uninfested areas. This requirement applies to equipment operated by DoD employees as well as contractors and vendors.

c. Whenever possible, native plant species grown from local stock should be used for conservation and landscaping purposes. There is an abundant variety of indigenous species available and they are usually less expensive.

d. DEL Natural Resources staff will regulate water levels in the Impact Area waterfowl impoundment at appropriate intervals to control the establishment of aquatic invasive species.

e. DEL Natural Resources staff will conduct an ongoing surveillance program to monitor the development of known infestations, control their spread, and be on the alert for new infestations. Funding permitting, the staff will reduce the invasive species population on Fort Lee.

3. **Effective Date.** This policy is effective on the above-mentioned date of this memorandum.

4. **Proponent.** Proponent for this policy is DEL's Environmental Management Office, extension 45061.

5. This policy supersedes Fort Lee Policy 34-01 dated 4 Sep 01.

*John R. Angevine /s/*  
JOHN R. ANGEVINE  
Colonel, US Army  
Garrison Commander

## Fort Lee

# Native Plant Directory

Prince George County, VA  
05/15/2006

**Prepared by: Resource Management Associates**  
**P. O. Box 119**  
**Locustville, VA 23404**  
**(757) 787-2637**  
**conserve@visi.net**

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## *Introduction*

The Native Plant Guide was designed for Fort Lee, Environmental Management Office (EMO) as a reference for proposed planting projects on the Post. A literature search was conducted to determine those plants that were adapted to the climate and conditions at Fort Lee. Native species were selected according to their UDA Plant Hardiness Zones and physiographic province, and then cross-referenced with the U.S. Fish and Wildlife Service's *Native Plants for Wildlife and Conservation Landscaping* (Slattery et als. 2003). Additional information was acquired from online sources and Michael A. Dirr's *Manual of Woody Landscape Plants* (Dirr, 1998). Final edits were conducted by an NC State horticulturist.

A very important planning consideration is to preserve existing native plants whenever possible prior to construction by clearly designating naturalized areas and protecting them from construction impacts. Protecting these sites along the periphery of construction zones is an effective method to segregate conflicting land uses with vegetative buffers.

Construction sites typically are adversely impacted by soil compaction and mixing of soil profiles that can create hostile environments for the establishment and maintenance of native plants. Compacted soils typically have poor water infiltration capability that can lead to plant nutrient and disease conditions. Therefore, advance planning and protecting zones along the periphery of construction sites can be a cost effective method to maintain and/or encourage the establishment of native plants.

It is very important to understand the intended function of a new land use and characteristics of potential plants to insure that the plants characteristics support and not conflict with the new use. Specie accounts have been developed to describe unique characteristics of each plant to support the plant selection process.



## Species Tables

### Native Trees

Genus	Species	Common Name	Habit	Height	Sun/Shade	Moisture	Page
Acer	negundo	boxelder	Deciduous	30-60'	Full sun/partial shade	Moist/wet	20
Acer	rubrum	red maple	Deciduous	40-100'	Full sun/partial shade	Moist/wet	21
Acer	saccharinum	silver maple	Deciduous	50-100'	Full sun/partial shade	Moist/wet	22
Acer	saccharum	sugar maple	Deciduous	60-100'	Full sun/partial shade/shade	Moist	23
Amelanchier	arborea	downy serviceberry	Deciduous	10-25'	Full sun/partial shade	Moist	24
Amelanchier	canadensis	canadian serviceberry	Deciduous	35-50'	Partial shade/shade	Moist/wet	25
Asimina	triloba	paw-paw	Deciduous	20-35'	Full sun	Moist	26
Betula	lenta	sweet birch	Deciduous	50-75'	Full sun/partial shade	Dry/moist	27
Betula	nigra	river birch	Deciduous	50-75'	Full sun/partial shade	Moist/wet	28
Carpinus	caroliniana	American hophornbeam	Deciduous	13-40'	Partial shade/shade	Moist	29
Carya	alba	mockernut hickory	Deciduous	60-100'	Partial shade/shade	Dry/moist	30
Carya	cordiformis	bitternut hickory	Deciduous	60-100'	Full sun	Moist/wet	31
Carya	glabra	pignut hickory	Deciduous	60-100'	Full sun/partial shade	Dry/moist/wet	32
Carya	ovata	shagbark hickory	Deciduous	70-100'	Full sun	Moist	33
Castanea	pumila	chinquapin	Deciduous	12-20'	Full sun/partial shade	Dry	34
Celtis	occidentalis	hackberry	Deciduous	40-100'	Full sun/partial shade/shade	Dry/moist/wet	35
Cercis	canadensis	eastern redbud	Deciduous	20-35'	Partial shade/shade	Dry/moist	36
Chamaecyparis	thyoides	Atlantic white cedar	Evergreen	75'	Partial shade/shade	Moist/wet	37
Chionanthus	virginicus	white fringetree	Deciduous	20-35'	Full sun/partial shade/shade	Dry/moist	38
Cornus	alternifolia	alternate-leaf dogwood	Deciduous	15-25'	Full sun/partial shade	Moist	39
Cornus	florida	flowering dogwood	Deciduous	20-50'	Partial shade	Dry/moist	40
Crataegus	crus-galli	cockspur hawthorn	Deciduous	20-35'	Full sun/partial shade	Dry/moist	41
Crataegus	viridis	green hawthorn	Deciduous	20-35'	Partial shade/shade	Moist/wet	42
Diospyros	virginiana	common persimmon	Deciduous	50-75'	Full sun/partial shade	Dry/moist	43
Fagus	grandifolia	American beech	Deciduous	50-100'	Full sun/partial shade	Moist	44
Fraxinus	americana	white ash	Deciduous	50-100'	Full sun/partial shade	Moist	45
Fraxinus	pennsylvanica	green ash	Deciduous	50-75'	Full sun/partial shade	Dry/moist/wet	46
Ilex	opaca	American holly	Evergreen	15-50'	Full sun/partial shade/shade	Moist	47
Juglans	nigra	black walnut	Deciduous	70-90'	Full sun	Moist	48
Juniperus	virginiana	eastern red cedar	Evergreen	50-75'	Full sun	Dry/moist	49
Liquidambar	styraciflua	sweetgum	Deciduous	60-100'	Full sun/partial shade	Moist/wet	50
Liriodendron	tulipifera	yellow poplar	Deciduous	70-100'	Full sun/partial shade	Moist	51
Magnolia	virginiana	sweetbay magnolia	Evergreen	12-30'	Full sun/partial shade/shade	Moist/wet	52
Malus	coronaria	sweet crabapple	Deciduous	10-30'	Full sun	Moist	53
Morus	rubra	red mulberry	Deciduous	35-60'	Full sun/partial shade	Moist	54
Nyssa	aquatica	water tupelo	Deciduous	35-50'	Full sun/partial shade	Moist/wet	55
Nyssa	sylvatica	black gum	Deciduous	30-75'	Full sun/partial shade	Dry/moist/wet	56
Ostrya	virginiana	hophornbeam	Deciduous	25-50'	Partial shade/shade	Moist	57
Persea	borbonia	redbay, sweet bay	Evergreen	15-40'	Full sun/partial shade	Dry/moist	58
Pinus	echinata	shortleaf pine	Evergreen	100'	Full sun	Dry/moist	59
Pinus	rigida	pitch pine	Evergreen	50-75'	Full sun	Dry	60
Pinus	serotina	pond pine	Evergreen	50-60'	Full sun	Moist/wet	61
Pinus	strobus	eastern white pine	Evergreen	75-100'	Full sun	Dry/moist	62
Pinus	taeda	loblolly pine	Evergreen	70-90'	Full sun	Dry/moist/wet	63
Pinus	virginiana	Virginia pine	Evergreen	50-80'	Full sun	Dry/moist	64
Platanus	occidentalis	American sycamore	Deciduous	75-100'	Full sun/partial shade	Moist/wet	65
Populus	deltoides	eastern cottonwood	Deciduous	75-100'	Full sun	Moist/wet	66
Populus	heterophylla	swamp cottonwood	Deciduous	80'	Full sun	Wet	67
Prunus	americana	American wild plum	Deciduous	20-35'	Full sun/partial shade	Dry/Moist	68
Prunus	serotina	black or wild cherry	Deciduous	40-75'	Full sun	Dry/moist	69
Quercus	alba	white oak	Deciduous	75-100'	Full sun/partial shade	Dry/moist	70
Quercus	bicolor	swamp white oak	Deciduous	60-100'	Full sun/partial shade	Wet	71
Quercus	coccinea	scarlet oak	Deciduous	40-75'	Full sun	Dry/moist	72
Quercus	falcata	southern red oak	Deciduous	70-80'	Full sun	Dry/moist	73
Quercus	marilandica	blackjack oak	Deciduous	35-50'	Partial shade	Dry	74
Quercus	michauxii	swamp chestnut oak	Deciduous	50-80'	Full sun	Moist/wet	75



## *Species Tables*

### *Native Trees (continued)*

Genus	Species	Common Name	Habit	Height	Sun/Shade	Moisture	Page
Quercus	muehlenbergii	chinkapin oak	Deciduous	35-50'	Full sun	Dry/moist	76
Quercus	nigra	water oak	Deciduous	50-80'	Partial shade/shade	Moist/wet	77
Quercus	palustris	pin oak	Deciduous	50-80'	Full sun	Moist/wet	78
Quercus	phellos	willow oak	Deciduous	80-100'	Full sun/partial shade	Moist/wet	79
Quercus	prinus	chestnut oak	Deciduous	40-80'	Full sun/partial shade/shade	Dry	80
Quercus	rubra	northern red oak	Deciduous	90'	Full sun/partial shade	Dry/moist	81
Quercus	stellata	post or iron oak	Deciduous	35-50'	Full sun	Dry/moist	82
Quercus	velutina	black oak	Deciduous	75-100'	Full sun	Dry/moist	83
Salix	nigra	black willow	Deciduous	35-50'	Full sun/partial shade	Moist/wet	84
Salix	sericea	silky willow	Deciduous	12'	Full sun/partial shade/shade	Moist/wet	85
Sassafras	albidum	sassafras	Deciduous	35-50'	Full sun/partial shade	Dry/moist	86
Taxodium	distichum	bald cypress	Deciduous	50-100'	Full sun/partial shade	Wet	87
Tilia	americana	American basswood	Deciduous	60-100'	Full sun	Dry	88
Tsuga	canadensis	eastern hemlock	Evergreen	75-100'	Partial shade	Moist	89
Ulmus	americana	American elm	Deciduous	75-100'	Full sun/partial shade	Moist/wet	90
Ulmus	rubra	slipery or red elm	Deciduous	70'	Partial shade/shade	Dry/moist	91



## Species Tables

### Native Shrubs

Genus	Species	Common Name	Habit	Height	Sun/Shade	Moisture	Page
Alnus	serrulata	smooth or hazel alder	Deciduous	12-20'	Full sun	moist/wet	93
Aralia	spinosa	Devil's walking stick	Deciduous	20-30'	Full sun/partial shade	dry/moist	94
Baccharis	halimifolia	groundsel tree	Deciduous	6-12'	Full sun	Dry/moist/wet	95
Callicarpa	americana	American beautyberry	Deciduous	6'	Full sun/partial shade	dry/moist	96
Ceanothus	americanus	New Jersey tea	Deciduous	3'	Full sun/partial shade	dry	97
Cephalanthus	occidentalis	buttonbush	Deciduous	6-12'	Full sun/partial shade/shade	moist/wet	98
Clethra	alnifolia	sweet pepperbush, summersweet	Deciduous	6-12'	Partial shade/shade	moist/wet	99
Cornus	amomum	silky dogwood, red willow	Deciduous	6-12'	Full sun/partial shade	moist/wet	100
Cornus	racemosa	red-pincked or gray dogwood	Deciduous	6-12'	Full sun/partial shade/shade	dry/moist	101
Corylus	americana	American hazelnut or filbert	Deciduous	10-15'	Partial shade	dry/moist	102
Gaylussacia	baccata	black huckleberry	Deciduous	1.5-3'	Partial shade/shade	Dry/moist/wet	103
Gaylussacia	frondosa	dangleberry	Deciduous	2-4'	Full sun/partial shade/shade	Dry/moist/wet	104
Hamamelis	virginiana	witch hazel	Deciduous	15-30'	Partial shade/shade	Dry/moist	105
Hydrangea	arborescens	wild or smooth hydrangea	Deciduous	3-6'	Partial shade/shade	Moist	106
Hypericum	densiflorum	dense St. John's wort	Deciduous	1.5-6'	Full sun	Dry/moist/wet	107
Ilex	decidua	deciduous holly, possumhaw	Deciduous	20-30'	Full sun/partial shade	dry/moist	108
Ilex	glabra	inkberry	Evergreen	6-10'	Full sun/partial shade/shade	dry/moist	109
Ilex	laevigata	smooth winterberry	Deciduous	10-12'	Full sun/partial shade	moist	110
Ilex	verticillata	winterberry holly, black alder	Deciduous	6-12'	Full sun/partial shade/shade	moist/wet	111
Itea	virginica	Virginia sweetspire	Evergreen	6-10'	Full sun/partial shade/shade	moist/wet	112
Iva	frutescens	marsh elder, high tide bush	Deciduous	2-10'	Full sun	dry/moist	113
Kalmia	angustifolia	sheep laurel or lambkill	Evergreen	2-3'	Full sun/partial shade/shade	moist/wet	114
Kalmia	latifolia	mountain laurel	Evergreen	12-20'	Full sun/partial shade/shade	dry/moist/wet	115
Leucothoe	racemosa	fatterbush, sweetbells	Evergreen	13'	Partial shade/shade	moist/wet	116
Lindera	benzoin	spicebush	Deciduous	6.5-16'	Partial shade/shade	moist/wet	117
Lyonia	ligustrina	male-berry	Deciduous	6-12'	Partial shade/shade	moist	118
Lyonia	mariana	stagger-bush	Deciduous	0.5-6.5'	Partial shade/shade	dry/moist	119
Myrica	carolinensis	southern or swamp bayberry	Evergreen	8-12'	Full sun/partial shade/shade	Dry/moist/wet	120
Myrica	cerifera	wax myrtle, southern bayberry	Evergreen	6-15'	Full sun/partial shade	Dry/moist/wet	121
Myrica	pensylvanica	northern bayberry, candleberry	Deciduous	5-10'	Full sun/partial shade	Dry/moist/wet	122
Photinia	melanocarpa	black chokeberry	Deciduous	3-6'	Full sun/partial shade	Dry/moist/wet	123
Photinia	pyrifolia	red chokeberry	Deciduous	1.5-13'	Full sun/partial shade	dry/moist/wet	124
Physocarpus	opulifolius	ninebark	Deciduous	5-12'	Full sun/partial shade	moist/wet	125
Rhododendron	atlanticum	dwarf or coast azalea	Deciduous	1-2.5'	Partial shade/shade	Moist	126
Rhododendron	maximum	great laurel or rosebay	Evergreen	15-20'	Partial shade/shade	moist/wet	127
Rhododendron	periclymenoides	pinxterbloom, pink azalea	Deciduous	3-10'	Full sun/partial shade/shade	Dry/moist/wet	128
Rhododendron	viscosum	swamp azalea	Deciduous	6.5-10'	Full sun/partial shade	moist/wet	129
Rhus	aromatica	fragrant sumac	Deciduous	6'	Full sun/partial shade	dry	130
Rhus	copallina	shining or winged sumac	Deciduous	20-35'	Full sun/partial shade	dry	131
Rhus	glabra	sweet or smoothed sumac	Deciduous	2-20'	Full sun	dry/moist	132
Rhus	hirta (typhina)	staghorn sumac	Deciduous	35-50'	Full sun	dry/moist	133
Ribes	rotundifolium	Appalachian gooseberry	Deciduous	3-6'	Partial shade	dry	134
Rosa	carolina	pasture rose	Deciduous	.5-3'	Full sun/partial shade	dry/moist	135
Rosa	palustris	swamp rose	Deciduous	8'	Full sun/partial shade/shade	moist/wet	136
Rubus	allegheniensis	Allegheny blackberry	Deciduous	3-9'	Full sun/partial shade	Dry/moist	137
Salix	humilis	prairie willow	Deciduous	6-12'	Full sun	Dry/moist/wet	138
Sambucus	nigra (canadensis)	common elderberry	Deciduous	6-12'	Full sun/partial shade/shade	dry/moist/wet	139
Spiraea	tomentosa	steeplesh, hardback spirea	Deciduous	3-6'	Full sun	moist/wet	140
Staphylea	trifolia	American bladdernut	Deciduous	3-15'	Shade	moist	141
Vaccinium	corymbosum	highbush blueberry	Deciduous	6-12'	Full sun/partial shade/shade	Dry/moist/wet	142
Vaccinium	pallidum	early lowbush blueberry	Deciduous	1.5-2'	Full sun/partial shade	dry/moist	143
Vaccinium	stamineum	deerberry	Deciduous	6-12'	Full sun/partial shade	dry/moist	144
Viburnum	acerifolium	maple-leaved arrowwood	Deciduous	3-6'	Full sun/partial shade/shade	dry/moist	145
Viburnum	dentatum (recognitum)	southern arrowwood	Deciduous	10-15'	Full sun/partial shade/shade	dry/moist/wet	146
Viburnum	nudum (cassinoides)	naked withered, possum-haw	Deciduous	6.5-20'	Full sun/partial shade/shade	moist/wet	147
Viburnum	prunifolium	black haw	Deciduous	12-24'	Full sun/partial shade/shade	dry/moist/wet	148



## *Species Tables*

### *Native Ground Covers*

Genus	Species	Common Name	Habit	Height	Sun/Shade	Moisture	Page
Andropogon	gerardii	big bluestem	perennial	2-6.5'	Full sun/partial shade	Dry/moist/wet	150
Andropogon	glomeratus	bushy bluestem	perennial	1.5-5'	Full sun/partial shade	Moist/wet	151
Andropogon	virginicus	broomsedge	perennial	1-3'	Full sun	Dry/moist/wet	152
Asclepias	tuberosa	butterflyweed, milkweed	perennial	1-3'	Full sun/partial shade	Dry/moist	153
Chrysogonum	virginianum	green-and-gold, golden knees	perennial	0.5-1'	Full sun/partial shade/shade	Dry/moist	154
Eupatorium	dubium	Joe-Pye weed	perennial	2-5'	Full sun/partial shade	Moist/wet	155
Lobelia	cardinalis	cardinal flower	perennial	2-4'	Full sun/partial shade	Moist/wet	156
Lobelia	siphilitica	great blue lobelia	perennial	1-5'	Full sun/partial shade/shade	Moist/wet	157
Monarda	didyma	bee-balm, Oswego tea	perennial	2-5'	Full sun/partial shade	Moist/wet	158
Monarda	punctata	horsemint, spotted bee-balm	perennial	0.5-3.5'	Full sun	Dry	159
Rudbeckia	hirta	black-eyed Susan	perennial	1-3.5'	Full sun/partial shade	Dry/moist	160
Schizachyrium (Andropogon)	scoparium (scoparius)	little bluestem	perennial	1.5-4'	Full sun	Dry	161
Sorghastrum	nutans	Indiangrass	perennial	2.5-8'	Full sun	Dry/moist	162



*Species Tables by Habit (Leaf Cycle)*

**Deciduous Trees**

Genus	Species	Common Name	Height	Sun/Shade	Moisture	Page
Acer	negundo	boxelder	30-60'	Full sun/partial shade	Moist/wet	20
Acer	rubrum	red maple	40-100'	Full sun/partial shade	Moist/wet	21
Acer	saccharinum	silver maple	50-100'	Full sun/partial shade	Moist/wet	22
Acer	saccharum	sugar maple	60-100'	Full sun/partial shade/shade	Moist	23
Amelanchier	arborea	downy serviceberry	10-25'	Full sun/partial shade	Moist	24
Amelanchier	canadensis	canadian serviceberry	35-50'	Partial shade/shade	Moist/wet	25
Asimina	triloba	paw-paw	20-35'	Full sun	Moist	26
Betula	lenta	sweet birch	50-75'	Full sun/partial shade	Dry/moist	27
Betula	nigra	river birch	50-75'	Full sun/partial shade	Moist/wet	28
Carpinus	caroliniana	American hophornbeam	13-40'	Partial shade/shade	Moist	29
Carya	alba	mockernut hickory	60-100'	Partial shade/shade	Dry/moist	30
Carya	cordiformis	bitternut hickory	60-100'	Full sun	Moist/wet	31
Carya	glabra	pignut hickory	60-100'	Full sun/partial shade	Dry/moist/wet	32
Carya	ovata	shagbark hickory	70-100'	Full sun	Moist	33
Castanea	pumila	chinquapin	12-20'	Full sun/partial shade	Dry	34
Celtis	occidentalis	hackberry	40-100'	Full sun/partial shade/shade	Dry/moist/wet	35
Cercis	canadensis	eastern redbud	20-35'	Partial shade/shade	Dry/moist	36
Chionanthus	virginicus	white fringetree	20-35'	Full sun/partial shade/shade	Dry/moist	38
Cornus	alternifolia	alternate-leaf dogwood	15-25'	Full sun/partial shade	Moist	39
Cornus	florida	flowering dogwood	20-50'	Partial shade	Dry/moist	40
Crataegus	crus-galli	cockspur hawthorn	20-35'	Full sun/partial shade	Dry/moist	41
Crataegus	viridis	green hawthorn	20-35'	Partial shade/shade	Moist/wet	42
Diospyros	virginiana	common persimmon	50-75'	Full sun/partial shade	Dry/moist	43
Fagus	grandifolia	American beech	50-100'	Full sun/partial shade	Moist	44
Fraxinus	americana	white ash	50-100'	Full sun/partial shade	Moist	45
Fraxinus	pennsylvanica	green ash	50-75'	Full sun/partial shade	Dry/moist/wet	46
Juglans	nigra	black walnut	70-90'	Full sun	Moist	48
Liquidambar	styraciflua	sweetgum	60-100'	Full sun/partial shade	Moist/wet	50
Liriodendron	tulipifera	yellow poplar	70-100'	Full sun/partial shade	Moist	51
Malus	coronaria	sweet crabapple	10-30'	Full sun	Moist	53
Morus	rubra	red mulberry	35-60'	Full sun/partial shade	Moist	54
Nyssa	aquatica	water tupelo	35-50'	Full sun/partial shade	Moist/wet	55
Nyssa	sylvatica	black gum	30-75'	Full sun/partial shade	Dry/moist/wet	56
Ostrya	virginiana	hophornbeam	25-50'	Partial shade/shade	Moist	57
Platanus	occidentalis	American sycamore	75-100'	Full sun/partial shade	Moist/wet	65
Populus	deltoides	eastern cottonwood	75-100'	Full sun	Moist/wet	66
Populus	heterophylla	swamp cottonwood	80'	Full sun	Wet	67
Prunus	americana	American wild plum	20-35'	Full sun/partial shade	Dry/Moist	68
Prunus	serotina	black or wild cherry	40-75'	Full sun	Dry/moist	69
Quercus	alba	white oak	75-100'	Full sun/partial shade	Dry/moist	70
Quercus	bicolor	swamp white oak	60-100'	Full sun/partial shade	Wet	71
Quercus	coccinea	scarlet oak	40-75'	Full sun	Dry/moist	72
Quercus	falcata	southern red oak	70-80'	Full sun	Dry/moist	73
Quercus	marilandica	blackjack oak	35-50'	Partial shade	Dry	74
Quercus	michauxii	swamp chestnut oak	50-80'	Full sun	Moist/wet	75
Quercus	muehlenbergii	chinkapin oak	35-50'	Full sun	Dry/moist	76
Quercus	nigra	water oak	50-80'	Partial shade/shade	Moist/wet	77
Quercus	palustris	pin oak	50-80'	Full sun	Moist/wet	78
Quercus	phellos	willow oak	80-100'	Full sun/partial shade	Moist/wet	79
Quercus	prinus	chestnut oak	40-80'	Full sun/partial shade/shade	Dry	80
Quercus	rubra	northern red oak	90'	Full sun/partial shade	Dry/moist	81
Quercus	stellata	post or iron oak	35-50'	Full sun	Dry/moist	82
Quercus	velutina	black oak	75-100'	Full sun	Dry/moist	83
Salix	nigra	black willow	35-50'	Full sun/partial shade	Moist/wet	84
Salix	sericea	silky willow	12'	Full sun/partial shade/shade	Moist/wet	85
Sassafras	albidum	sassafras	35-50'	Full sun/partial shade	Dry/moist	86
Taxodium	distichum	bald cypress	50-100'	Full sun/partial shade	Wet	87
Tilia	americana	American basswood	60-100'	Full sun	Dry	88
Ulmus	americana	American elm	75-100'	Full sun/partial shade	Moist/wet	90
Ulmus	rubra	slipery or red elm	70'	Partial shade/shade	Dry/moist	91



*Species Tables by Habit (Leaf Cycle)*

*Deciduous Shrubs*

Genus	Species	Common Name	Height	Sun/Shade	Moisture	Page
Alnus	serrulata	smooth or hazel alder	12-20'	Full sun	moist/wet	93
Aralia	spinosa	Devil's walking stick	20-30'	Full sun/partial shade	dry/moist	94
Baccharis	halimifolia	groundsel tree	6-12'	Full sun	Dry/moist/wet	95
Callicarpa	americana	American beautyberry	6'	Full sun/partial shade	dry/moist	96
Ceanothus	americanus	New Jersey tea	3'	Full sun/partial shade	dry	97
Cephalanthus	occidentalis	buttonbush	6-12'	Full sun/partial shade/shade	moist/wet	98
Clethra	alnifolia	sweet pepperbush, summersweet	6-12'	Partial shade/shade	moist/wet	99
Cornus	amomum	silky dogwood, red willow	6-12'	Full sun/partial shade	moist/wet	100
Cornus	racemosa	red-pincked or gray dogwood	6-12'	Full sun/partial shade/shade	dry/moist	101
Corylus	americana	American hazelnut or filbert	10-15'	Partial shade	dry/moist	102
Gaylussacia	baccata	black huckleberry	1.5-3'	Partial shade/shade	Dry/moist/wet	103
Gaylussacia	frondosa	dangleberry	2-4'	Full sun/partial shade/shade	Dry/moist/wet	104
Hamamelis	virginiana	witch hazel	15-30'	Partial shade/shade	Dry/moist	105
Hydrangea	arborescens	wild or smooth hydrangea	3-6'	Partial shade/shade	Moist	106
Hypericum	densiflorum	dense St. John's wort	1.5-6'	Full sun	Dry/moist/wet	107
Ilex	decidua	deciduous holly, possumhaw	20-30'	Full sun/partial shade	dry/moist	108
Ilex	laevigata	smooth winterberry	10-12'	Full sun/partial shade	moist	110
Ilex	verticillata	winterberry holly, black alder	6-12'	Full sun/partial shade/shade	moist/wet	111
Iva	frutescens	marsh elder, high tide bush	2-10'	Full sun	dry/moist	113
Lindera	benzoin	spicebush	6.5-16'	Partial shade/shade	moist/wet	117
Lyonia	ligustrina	male-berry	6-12'	Partial shade/shade	moist	118
Lyonia	mariana	stagger-bush	0.5-6.5'	Partial shade/shade	dry/moist	119
Myrica	pensylvanica	northern bayberry, candleberry	5-10'	Full sun/partial shade	Dry/moist/wet	122
Photinia	melanocarpa	black chokeberry	3-6'	Full sun/partial shade	Dry/moist/wet	123
Photinia	pyrifolia	red chokeberry	1.5-13'	Full sun/partial shade	dry/moist/wet	124
Physocarpus	opulifolius	ninebark	5-12'	Full sun/partial shade	moist/wet	125
Rhododendron	atlanticum	dwarf or coast azalea	1-2.5'	Partial shade/shade	Moist	126
Rhododendron	periclymenoides	pinxterbloom, pink azalea	3-10'	Full sun/partial shade/shade	Dry/moist/wet	128
Rhododendron	viscosum	swamp azalea	6.5-10'	Full sun/partial shade	moist/wet	129
Rhus	aromatica	fragrant sumac	6'	Full sun/partial shade	dry	130
Rhus	copallina	shining or winged sumac	20-35'	Full sun/partial shade	dry	131
Rhus	glabra	sweet or smoothed sumac	2-20'	Full sun	dry/moist	132
Rhus	hirta (typhina)	staghorn sumac	35-50'	Full sun	dry/moist	133
Ribes	rotundifolium	Appalachian gooseberry	3-6'	Partial shade	dry	134
Rosa	carolina	pasture rose	.5-3'	Full sun/partial shade	dry/moist	135
Rosa	palustris	swamp rose	8'	Full sun/partial shade/shade	moist/wet	136
Rubus	allegheniensis	Allegheny blackberry	3-9'	Full sun/partial shade	Dry/moist	137
Salix	humilis	prairie willow	6-12'	Full sun	Dry/moist/wet	138
Sambucus	nigra (canadensis)	common elderberry	6-12'	Full sun/partial shade/shade	dry/moist/wet	139
Spiraea	tomentosa	steplebush, hardback spirea	3-6'	Full sun	moist/wet	140
Staphylea	trifolia	American bladdernut	3-15'	Shade	moist	141
Vaccinium	corymbosum	highbush blueberry	6-12'	Full sun/partial shade/shade	Dry/moist/wet	142
Vaccinium	pallidum	early lowbush blueberry	1.5-2'	Full sun/partial shade	dry/moist	143
Vaccinium	stamineum	deerberry	6-12'	Full sun/partial shade	dry/moist	144
Viburnum	acerifolium	maple-leaved arrowwood	3-6'	Full sun/partial shade/shade	dry/moist	145
Viburnum	(recognitum)	southern arrowwood	10-15'	Full sun/partial shade/shade	dry/moist/wet	146
Viburnum	nudum (cassinoides)	naked witherod, possum-haw	6.5-20'	Full sun/partial shade/shade	moist/wet	147
Viburnum	prunifolium	black haw	12-24'	Full sun/partial shade/shade	dry/moist/wet	148

*Species Tables by Habit (Leaf Cycle)*

*Evergreen Trees*

Genus	Species	Common Name	Height	Sun/Shade	Moisture	Page
Chamaecyparis	thyoides	Atlantic white cedar	75'	Partial shade/shade	Moist/wet	37
Ilex	opaca	American holly	15-50'	Full sun/partial shade/shade	Moist	47
Juniperus	virginiana	eastern red cedar	50-75'	Full sun	Dry/moist	49
Magnolia	virginiana	sweetbay magnolia	12-30'	Full sun/partial shade/shade	Moist/wet	52
Persea	borbonia	redbay, sweet bay	15-40'	Full sun/partial shade	Dry/moist	58
Pinus	echinata	shortleaf pine	100'	Full sun	Dry/moist	59
Pinus	rigida	pitch pine	50-75'	Full sun	Dry	60
Pinus	serotina	pond pine	50-60'	Full sun	Moist/wet	61
Pinus	strobus	eastern white pine	75-100'	Full sun	Dry/moist	62
Pinus	taeda	loblolly pine	70-90'	Full sun	Dry/moist/wet	63
Pinus	virginiana	Virginia pine	50-80'	Full sun	Dry/moist	64
Tsuga	canadensis	eastern hemlock	75-100'	Partial shade	Moist	89



*Species Tables by Habit (Leaf Cycle)*

*Evergreen Shrubs*

Genus	Species	Common Name	Height	Sun/Shade	Moisture	Page
Ilex	glabra	inkberry	6-10'	Full sun/partial shade/shade	dry/moist	109
Itea	virginica	Virginia sweetspire	6-10'	Full sun/partial shade/shade	moist/wet	112
Kalmia	angustifolia	sheep laurel or lambkill	2-3'	Full sun/partial shade/shade	moist/wet	114
Kalmia	latifolia	mountain laurel	12-20'	Full sun/partial shade/shade	dry/moist/wet	115
Leucothoe	racemosa	fatterbush, sweetbells	13'	Partial shade/shade	moist/wet	116
Myrica	caroliniensis	southern or swamp bayberry	8-12'	Full sun/partial shade/shade	Dry/moist/wet	120
Myrica	cerifera	wax myrtle, southern bayberry	6-15'	Full sun/partial shade	Dry/moist/wet	121
Rhododendron	maximum	great laurel or rosebay	15-20'	Partial shade/shade	moist/wet	127

*Species Tables by Sunlight Dependency*

**Full Sun - Deciduous Trees**

Genus	Species	Common Name	Height	Moisture	Page
Acer	negundo	boxelder	30-60'	Moist/wet	20
Acer	rubrum	red maple	40-100'	Moist/wet	21
Acer	saccharinum	silver maple	50-100'	Moist/wet	22
Acer	saccharum	sugar maple	60-100'	Moist	23
Amelanchier	arborea	downy serviceberry	10-25'	Moist	24
Asimina	triloba	paw-paw	20-35'	Moist	26
Betula	lenta	sweet birch	50-75'	Dry/moist	27
Betula	nigra	river birch	50-75'	Moist/wet	28
Carya	cordiformis	bitternut hickory	60-100'	Moist/wet	31
Carya	glabra	pignut hickory	60-100'	Dry/moist/wet	32
Carya	ovata	shagbark hickory	70-100'	Moist	33
Castanea	pumila	chinquapin	12-20'	Dry	34
Celtis	occidentalis	hackberry	40-100'	Dry/moist/wet	35
Chionanthus	virginicus	white fringetree	20-35'	Dry/moist	38
Cornus	alternifolia	alternate-leaf dogwood	15-25'	Moist	39
Crataegus	crus-galli	cockspur hawthorn	20-35'	Dry/moist	41
Diospyros	virginiana	common persimmon	50-75'	Dry/moist	43
Fagus	grandifolia	American beech	50-100'	Moist	44
Fraxinus	americana	white ash	50-100'	Moist	45
Fraxinus	pennsylvanica	green ash	50-75'	Dry/moist/wet	46
Juglans	nigra	black walnut	70-90'	Moist	48
Liquidambar	styraciflua	sweetgum	60-100'	Moist/wet	50
Liriodendron	tulipifera	yellow poplar	70-100'	Moist	51
Malus	coronaria	sweet crabapple	10-30'	Moist	53
Morus	rubra	red mulberry	35-60'	Moist	54
Nyssa	aqualica	water tupelo	35-50'	Moist/wet	55
Nyssa	sylvatica	black gum	30-75'	Dry/moist/wet	56
Platanus	occidentalis	American sycamore	75-100'	Moist/wet	65
Populus	deltoides	eastern cottonwood	75-100'	Moist/wet	66
Populus	heterophylla	swamp cottonwood	80'	Wet	67
Prunus	americana	American wild plum	20-35'	Dry/Moist	68
Prunus	serotina	black or wild cherry	40-75'	Dry/moist	69
Quercus	alba	white oak	75-100'	Dry/moist	70
Quercus	bicolor	swamp white oak	60-100'	Wet	71
Quercus	coccinea	scarlet oak	40-75'	Dry/moist	72
Quercus	falcata	southern red oak	70-80'	Dry/moist	73
Quercus	michauxii	swamp chestnut oak	50-80'	Moist/wet	75
Quercus	muehlenbergii	chinkapin oak	35-50'	Dry/moist	76
Quercus	palustris	pin oak	50-80'	Moist/wet	78
Quercus	phellos	willow oak	80-100'	Moist/wet	79
Quercus	prinus	chestnut oak	40-80'	Dry	80
Quercus	rubra	northern red oak	90'	Dry/moist	81
Quercus	stellata	post or iron oak	35-50'	Dry/moist	82
Quercus	velutina	black oak	75-100'	Dry/moist	83
Salix	nigra	black willow	35-50'	Moist/wet	84
Salix	sericea	silky willow	12'	Moist/wet	85
Sassafras	albidum	sassafras	35-50'	Dry/moist	86
Taxodium	distichum	bald cypress	50-100'	Wet	87
Tilia	americana	American basswood	60-100'	Dry	88
Ulmus	americana	American elm	75-100'	Moist/wet	90

**Full Sun - Evergreen Trees**

Genus	Species	Common Name	Height	Moisture	Page
Ilex	opaca	American holly	15-50'	Moist	47
Juniperus	virginiana	eastern red cedar	50-75'	Dry/moist	49
Magnolia	virginiana	sweetbay magnolia	12-30'	Moist/wet	52
Persea	borbonia	redbay, sweet bay	15-40'	Dry/moist	58
Pinus	echinata	shortleaf pine	100'	Dry/moist	59
Pinus	rigida	pitch pine	50-75'	Dry	60
Pinus	serotina	pond pine	50-60'	Moist/wet	61
Pinus	strobus	eastern white pine	75-100'	Dry/moist	62
Pinus	taeda	loblolly pine	70-90'	Dry/moist/wet	63
Pinus	virginiana	Virginia pine	50-80'	Dry/moist	64



### Species Tables by Sunlight Dependency

#### Full Sun - Deciduous Shrubs

Genus	Species	Common Name	Height	Moisture	Page
Alnus	serrulata	smooth or hazel alder	12-20'	moist/wet	93
Aralia	spinosa	Devil's walking stick	20-30'	dry/moist	94
Baccharis	halimifolia	groundsel tree, sea myrtle	6-12'	Dry/moist/wet	95
Callicarpa	americana	American beautyberry	6'	dry/moist	96
Ceanothus	americanus	New Jersey tea	3'	dry	97
Cephalanthus	occidentalis	buttonbush	6-12'	moist/wet	98
Cornus	amomum	silky dogwood, red willow	6-12'	moist/wet	100
Cornus	racemosa	red-pinckled or gray dogwood	6-12'	dry/moist	101
Gaylussacia	frondosa	dangleberry	2-4'	Dry/moist/wet	104
Hypericum	densiflorum	dense St. John's wort	1.5-6'	Dry/moist/wet	107
Ilex	decidua	deciduous holly or possumhaw	20-30'	dry/moist	108
Ilex	laevigata	smooth winterberry	10-12'	moist	110
Ilex	verticillata	winterberry holly or black alder	6-12'	moist/wet	111
Iva	frutescens	marsh elder, high tide bush	2-10'	dry/moist	113
Morella	pensylvanica	northern bayberry or candleberry	5-10'	Dry/moist/wet	122
Photinia	melanocarpa	black chokeberry	3-6'	Dry/moist/wet	123
Photinia	pyrifolia	red chokeberry	1.5-13'	dry/moist/wet	124
Physocarpus	opulifolius	ninebark	5-12'	moist/wet	125
Rhododendron	periclymenoides	pinxterbloom or pink azalea	3-10'	Dry/moist/wet	128
Rhododendron	viscosum	swamp azalea	6.5-10'	moist/wet	129
Rhus	aromatica	fragrant sumac	6'	dry	130
Rhus	copallina	shining, winged, dwarf sumac	20-35'	dry	131
Rhus	glabra	sweet or smoothed sumac	2-20'	dry/moist	132
Rhus	hirta (typhina)	staghorn sumac	35-50'	dry/moist	133
Rosa	carolina	pasture rose	.5-3'	dry/moist	135
Rosa	palustris	swamp rose	8'	moist/wet	136
Rubus	allegheniensis	Allegheny blackberry	3-9'	Dry/moist	137
Salix	humilis	prairie willow	6-12'	Dry/moist/wet	138
Sambucus	nigra (canadensis)	common elderberry or American elder	6-12'	dry/moist/wet	139
Spiraea	tomentosa	steeplebush, hardback spirea	3-6'	moist/wet	140
Vaccinium	corymbosum	highbush blueberry	6-12'	Dry/moist/wet	142
Vaccinium	pallidum	early lowbush blueberry	1.5-2'	dry/moist	143
Vaccinium	stamineum	deerberry	6-12'	dry/moist	144
Viburnum	acerifolium	maple-leaved arrowwood	3-6'	dry/moist	145
Viburnum	dentatum (recognitum)	southern arrowwood	10-15'	dry/moist/wet	146
Viburnum	nudum (cassinoides)	naked withered or possum-haw	6.5-20'	moist/wet	147
Viburnum	prunifolium	black haw	12-24'	dry/moist/wet	148

#### Full Sun - Evergreen Shrubs

Genus	Species	Common Name	Height	Moisture	Page
Ilex	glabra	inkberry	6-10'	dry/moist	109
Itea	virginica	Virginia sweetspire	6-10'	moist/wet	112
Kalmia	angustifolia	sheep laurel or lambkill	2-3'	moist/wet	114
Kalmia	latifolia	mountain laurel	12-20'	dry/moist/wet	115
Morella	caroliniensis	southern or swamp bayberry	8-12'	Dry/moist/wet	120
Morella	cerifera	wax myrtle or southern bayberry	6-15'	Dry/moist/wet	121



*Species Tables by Sunlight Dependency*

*Full Sun - Perennial Ground Covers*

Genus	Species	Common Name	Height	Moisture	Page
Monarda	punctata	horsemint, spotted bee-balm	0.5-3.5'	Dry	159
Schizachyrium (Andropogon)	scoparium (scoparius)	little bluestem	1.5-4'	Dry	161
Sorghastrum	nutans	Indiangrass	2.5-8'	Dry/moist	162
Andropogon	virginicus	broomsedge	1-3'	Dry/moist/wet	152
Andropogon	gerardii	big bluestem	2-6.5'	Dry/moist/wet	150
Andropogon	glomeratus	bushy bluestem	1.5-5'	Moist/wet	151
Asclepias	tuberosa	butterflyweed, milkweed	1-3'	Dry/moist	153
Eupatorium	dubium	Joe-Pye weed	2-5'	Moist/wet	155
Monarda	didyma	beebalm, Oswego tea	2-5'	Moist/wet	158
Rudbeckia	hirta	black-eyed Susan	1-3.5'	Dry/moist	160
Chrysogonum	virginianum	green-and-gold, golden knees	0.5-1'	Dry/moist	154
Lobelia	siphilitica	great blue lobelia	1-5'	Moist/wet	157
Lobelia	cardinalis	cardinal flower	2-4'	Moist/wet	156

### Species Tables by Sunlight Dependency

#### Partial Shade - Deciduous Trees

Genus	Species	Common Name	Height	Moisture	Page
Acer	negundo	boxelder	30-60'	Moist/wet	20
Acer	rubrum	red maple	40-100'	Moist/wet	21
Acer	saccharinum	silver maple	50-100'	Moist/wet	22
Acer	saccharum	sugar maple	60-100'	Moist	23
Amelanchier	arborea	downy serviceberry	10-25'	Moist	24
Amelanchier	canadensis	canadian serviceberry	35-50'	Moist/wet	25
Betula	lenta	sweet birch	50-75'	Dry/moist	27
Betula	nigra	river birch	50-75'	Moist/wet	28
Carpinus	caroliniana	American hombeam	13-40'	Moist	29
Carya	alba	mockernut hickory	60-100'	Dry/moist	30
Carya	glabra	pignut hickory	60-100'	Dry/moist/wet	32
Castanea	pumila	chinquapin	12-20'	Dry	34
Celtis	occidentalis	hackberry	40-100'	Dry/moist/wet	35
Cercis	canadensis	eastern redbud	20-35'	Dry/moist	36
Chionanthus	virginicus	white fringetree	20-35'	Dry/moist	38
Cornus	alternifolia	alternate-leaf dogwood	15-25'	Moist	39
Cornus	florida	flowering dogwood	20-50'	Dry/moist	40
Crataegus	crus-galli	cockspur hawthorn	20-35'	Dry/moist	41
Crataegus	viridis	green hawthorn	20-35'	Moist/wet	42
Diospyros	virginiana	common persimmon	50-75'	Dry/moist	43
Fagus	grandifolia	American beech	50-100'	Moist	44
Fraxinus	americana	white ash	50-100'	Moist	45
Fraxinus	pennsylvanica	green ash	50-75'	Dry/moist/wet	46
Liquidambar	styraciflua	sweetgum	60-100'	Moist/wet	50
Liriodendron	tulipifera	yellow poplar	70-100'	Moist	51
Morus	rubra	red mulberry	35-60'	Moist	54
Nyssa	aquatica	water tupelo	35-50'	Moist/wet	55
Nyssa	sylvatica	black gum	30-75'	Dry/moist/wet	56
Ostrya	virginiana	hophornbeam	25-50'	Moist	57
Platanus	occidentalis	American sycamore	75-100'	Moist/wet	65
Prunus	americana	American wild plum	20-35'	Dry/Moist	68
Quercus	alba	white oak	75-100'	Dry/moist	70
Quercus	bicolor	swamp white oak	60-100'	Wet	71
Quercus	marilandica	blackjack oak	35-50'	Dry	74
Quercus	nigra	water oak	50-80'	Moist/wet	77
Quercus	phellos	willow oak	80-100'	Moist/wet	79
Quercus	prinus	chestnut oak	40-80'	Dry	80
Quercus	rubra	northern red oak	90'	Dry/moist	81
Salix	nigra	black willow	35-50'	Moist/wet	84
Salix	sericea	silky willow	12'	Moist/wet	85
Sassafras	albidum	sassafras	35-50'	Dry/moist	86
Taxodium	distichum	bald cypress	50-100'	Wet	87
Ulmus	americana	American elm	75-100'	Moist/wet	90
Ulmus	rubra	slipery or red elm	70'	Dry/moist	91

#### Partial Shade - Evergreen Trees

Genus	Species	Common Name	Height	Moisture	Page
Chamaecyparis	thyoides	Atlantic white cedar	75'	Moist/wet	37
Ilex	opaca	American holly	15-50'	Moist	47
Magnolia	virginiana	sweetbay magnolia	12-30'	Moist/wet	52
Persea	borbonia	redbay, sweet bay	15-40'	Dry/moist	58
Tsuga	canadensis	eastern hemlock	75-100'	Moist	89



*Species Tables by Sunlight Dependency*

*Partial Shade - Deciduous Shrubs*

Genus	Species	Common Name	Height	Moisture	Page
Aralia	spinosa	Devil's walking stick	20-30'	dry/moist	94
Callicarpa	americana	American beautyberry	6'	dry/moist	96
Ceanothus	americanus	New Jersey tea	3'	dry	97
Cephalanthus	occidentalis	buttonbush	6-12'	moist/wet	98
Clethra	alnifolia	sweet pepperbush or summersweet	6-12'	moist/wet	99
Cornus	amomum	silky dogwood, red willow	6-12'	moist/wet	100
Cornus	racemosa	red-pincked or gray dogwood	6-12'	dry/moist	101
Corylus	americana	American hazelnut or filbert	10-15'	dry/moist	102
Gaylussacia	baccata	black huckleberry	1.5-3'	Dry/moist/wet	103
Gaylussacia	frondosa	dangleberry	2-4'	Dry/moist/wet	104
Hamamelis	virginiana	witch hazel	15-30'	Dry/moist	105
Hydrangea	arborescens	wild or smooth hydrangea	3-6'	Moist	106
Ilex	decidua	deciduous holly or possumhaw	20-30'	dry/moist	108
Ilex	laevigata	smooth winterberry	10-12'	moist	110
Ilex	verticillata	winterberry holly or black alder	6-12'	moist/wet	111
Lindera	benzoin	spicebush	6.5-16'	moist/wet	117
Lyonia	ligustrina	male-berry	6-12'	moist	118
Lyonia	mariana	stagger-bush	0.5-6.5'	dry/moist	119
Morella	pensylvanica	northern bayberry or candleberry	5-10'	Dry/moist/wet	122
Photinia	melanocarpa	black chokeberry	3-6'	Dry/moist/wet	123
Photinia	pyrifolia	red chokeberry	1.5-13'	dry/moist/wet	124
Physocarpus	opulifolius	ninebark	5-12'	moist/wet	125
Rhododendron	atlanticum	dwarf or coast azalea	1-2.5'	Moist	126
Rhododendron	periclymenoides	pinxterbloom or pink azalea	3-10'	Dry/moist/wet	128
Rhododendron	viscosum	swamp azalea	6.5-10'	moist/wet	129
Rhus	aromatica	fragrant sumac	6'	dry	130
Rhus	copallina	shining, winged, dwarf sumac	20-35'	dry	131
Ribes	rotundifolium	Appalachian or eastern gooseberry	3-6'	dry	134
Rosa	carolina	pasture rose	.5-3'	dry/moist	135
Rosa	palustris	swamp rose	8'	moist/wet	136
Rubus	allegheniensis	Allegheny blackberry	3-9'	Dry/moist	137
Sambucus	nigra (canadensis)	common elderberry or American elder	6-12'	dry/moist/wet	139
Vaccinium	corymbosum	highbush blueberry	6-12'	Dry/moist/wet	142
Vaccinium	pallidum	early lowbush blueberry	1.5-2'	dry/moist	143
Vaccinium	stamineum	deerberry	6-12'	dry/moist	144
Viburnum	acerifolium	maple-leaved arrowwood	3-6'	dry/moist	145
Viburnum	dentatum (recognitum)	southern arrowwood	10-15'	dry/moist/wet	146
Viburnum	nudum (cassinoides)	naked witherod or possum-haw	6.5-20'	moist/wet	147
Viburnum	prunifolium	black haw	12-24'	dry/moist/wet	148

*Partial Shade - Evergreen Shrubs*

Genus	Species	Common Name	Height	Moisture	Page
Ilex	glabra	inkberry	6-10'	dry/moist	109
Itea	virginica	Virginia sweetspire	6-10'	moist/wet	112
Kalmia	angustifolia	sheep laurel or lambkill	2-3'	moist/wet	114
Kalmia	latifolia	mountain laurel	12-20'	dry/moist/wet	115
Leucothoe	racemosa	fatterbush, sweetbells	13'	moist/wet	116
Morella	caroliniensis	southern or swamp bayberry	8-12'	Dry/moist/wet	120
Morella	cerifera	wax myrtle or southern bayberry	6-15'	Dry/moist/wet	121
Rhododendron	maximum	great laurel or rosebay rhododendron	15-20'	moist/wet	127

*Species Tables by Sunlight Dependency*

*Partial Shade - Perennial Ground Covers*

Genus	Species	Common Name	Height	Moisture	Page
Andropogon	gerardii	big bluestem	2-6.5'	Dry/moist/wet	150
Andropogon	glomeratus	bushy bluestem	1.5-5'	Moist/wet	151
Asclepias	tuberosa	butterflyweed, milkweed	1-3'	Dry/moist	153
Eupatorium	dubium	Joe-Pye weed	2-5'	Moist/wet	155
Monarda	didyma	bee balm, Oswego tea	2-5'	Moist/wet	158
Rudbeckia	hirta	black-eyed Susan	1-3.5'	Dry/moist	160
Chrysogonum	virginianum	green-and-gold, golden knees	0.5-1'	Dry/moist	154
Lobelia	siphilitica	great blue lobelia	1-5'	Moist/wet	157
Lobelia	cardinalis	cardinal flower	2-4'	Moist/wet	156



*Species Tables by Sunlight Dependency*

*Shade - Deciduous Trees*

Genus	Species	Common Name	Height	Moisture	Page
Acer	saccharum	sugar maple	60-100'	Moist	23
Amelanchier	canadensis	canadian serviceberry	35-50'	Moist/wet	25
Carpinus	caroliniana	American hophornbeam	13-40'	Moist	29
Carya	alba	mockernut hickory	60-100'	Dry/moist	30
Celtis	occidentalis	hackberry	40-100'	Dry/moist/wet	35
Cercis	canadensis	eastern redbud	20-35'	Dry/moist	36
Chionanthus	virginicus	white fringetree	20-35'	Dry/moist	38
Crataegus	viridis	green hawthorn	20-35'	Moist/wet	42
Ostrya	virginiana	hophornbeam	25-50'	Moist	57
Quercus	nigra	water oak	50-80'	Moist/wet	77
Quercus	prinus	chestnut oak	40-80'	Dry	80
Salix	sericea	silky willow	12'	Moist/wet	85
Ulmus	rubra	slipery or red elm	70'	Dry/moist	91

*Shade - Evergreen Trees*

Genus	Species	Common Name	Height	Moisture	Page
Chamaecyparis	thyoides	Atlantic white cedar	75'	Moist/wet	37
Ilex	opaca	American holly	15-50'	Moist	47
Magnolia	virginiana	sweetbay magnolia	12-30'	Moist/wet	52

### *Species Tables by Sunlight Dependency*

#### *Shade - Deciduous Shrubs*

Genus	Species	Common Name	Height	Moisture	Page
Cephalanthus	occidentalis	buttonbush	6-12'	moist/wet	98
Clethra	alnifolia	sweet pepperbush or summersweet	6-12'	moist/wet	99
Cornus	racemosa	red-pincked or gray dogwood	6-12'	dry/moist	101
Gaylussacia	baccata	black huckleberry	1.5-3'	Dry/moist/wet	103
Gaylussacia	frondosa	dangleberry	2-4'	Dry/moist/wet	104
Hamamelis	virginiana	witch hazel	15-30'	Dry/moist	105
Hydrangea	arborescens	wild or smooth hydrangea	3-6'	Moist	106
Ilex	verticillata	winterberry holly or black alder	6-12'	moist/wet	111
Lindera	benzoin	spicebush	6.5-16'	moist/wet	117
Lyonia	ligustrina	male-berry	6-12'	moist	118
Lyonia	mariana	stagger-bush	0.5-6.5'	dry/moist	119
Rhododendron	atlanticum	dwarf or coast azalea	1-2.5'	Moist	126
Rhododendron	periclymenoides	pinxterbloom or pink azalea	3-10'	Dry/moist/wet	128
Rosa	palustris	swamp rose	8'	moist/wet	136
Sambucus	nigra (canadensis)	common elderberry or American elder	6-12'	dry/moist/wet	139
Staphylea	trifolia	American bladdernut	3-15'	moist	141
Vaccinium	corymbosum	highbush blueberry	6-12'	Dry/moist/wet	142
Viburnum	acerifolium	maple-leaved arrowwood	3-6'	dry/moist	145
Viburnum	dentatum (recognitum)	southern arrowwood	10-15'	dry/moist/wet	146
Viburnum	nudum (cassinoides)	naked witherod or possum-haw	6.5-20'	moist/wet	147
Viburnum	prunifolium	black haw	12-24'	dry/moist/wet	148

#### *Shade - Evergreen Shrubs*

Genus	Species	Common Name	Height	Moisture	Page
Ilex	glabra	inkberry	6-10'	dry/moist	109
Itea	virginica	Virginia sweetspire	6-10'	moist/wet	112
Kalmia	angustifolia	sheep laurel or lambkill	2-3'	moist/wet	114
Kalmia	latifolia	mountain laurel	12-20'	dry/moist/wet	115
Leucothoe	racemosa	fatterbush, sweetbells	13'	moist/wet	116
Morella	caroliniensis	southern or swamp bayberry	8-12'	Dry/moist/wet	120
Rhododendron	maximum	great laurel or rosebay rhododendron	15-20'	moist/wet	127

*Species Tables by Sunlight Dependency*

*Partial Shade - Perennial Ground Covers*

Genus	Species	Common Name	Height	Moisture	Page
Chrysogonum	virginianum	green-and-gold, golden knees	0.5-1'	Dry/moist	154
Lobelia	siphilitica	great blue lobelia	1-5'	Moist/wet	157

# **APPENDIX J**

## **AIT COMPLEX DRAWINGS AND DETAILS**

### **Index**

- **BARRACKS/COMPANY OPERATIONS (B/COF) FLOORPLANS**
- **BARRACKS/COMPANY OPERATIONS (B/COF) RENDERINGS**
- **LAWN EQUIPMENT BUILDING FLOOR PLANS AND ELEVATION**
- **PT PIT CLIMBING BAR DETAILS**



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FORT\_WORTH,\_TEXAS

ADVANCED INDIVIDUAL TRAINING  
BARRACKS COMPANY OPERATIONS FACILITY  
PN:36113

Sheet  
reference  
number:

A-101



**1ST FLR - ADVANCED INDIVIDUAL TRAINING B-COF**

35,825 GSF Phase 1a  
13,114 GSF Phase 2  
3,500 GSF COVERED TRAINING/ASSEMBLY AREA Phase 1a  
3,500 GSF COVERED TRAINING/ASSEMBLY AREA Phase 2

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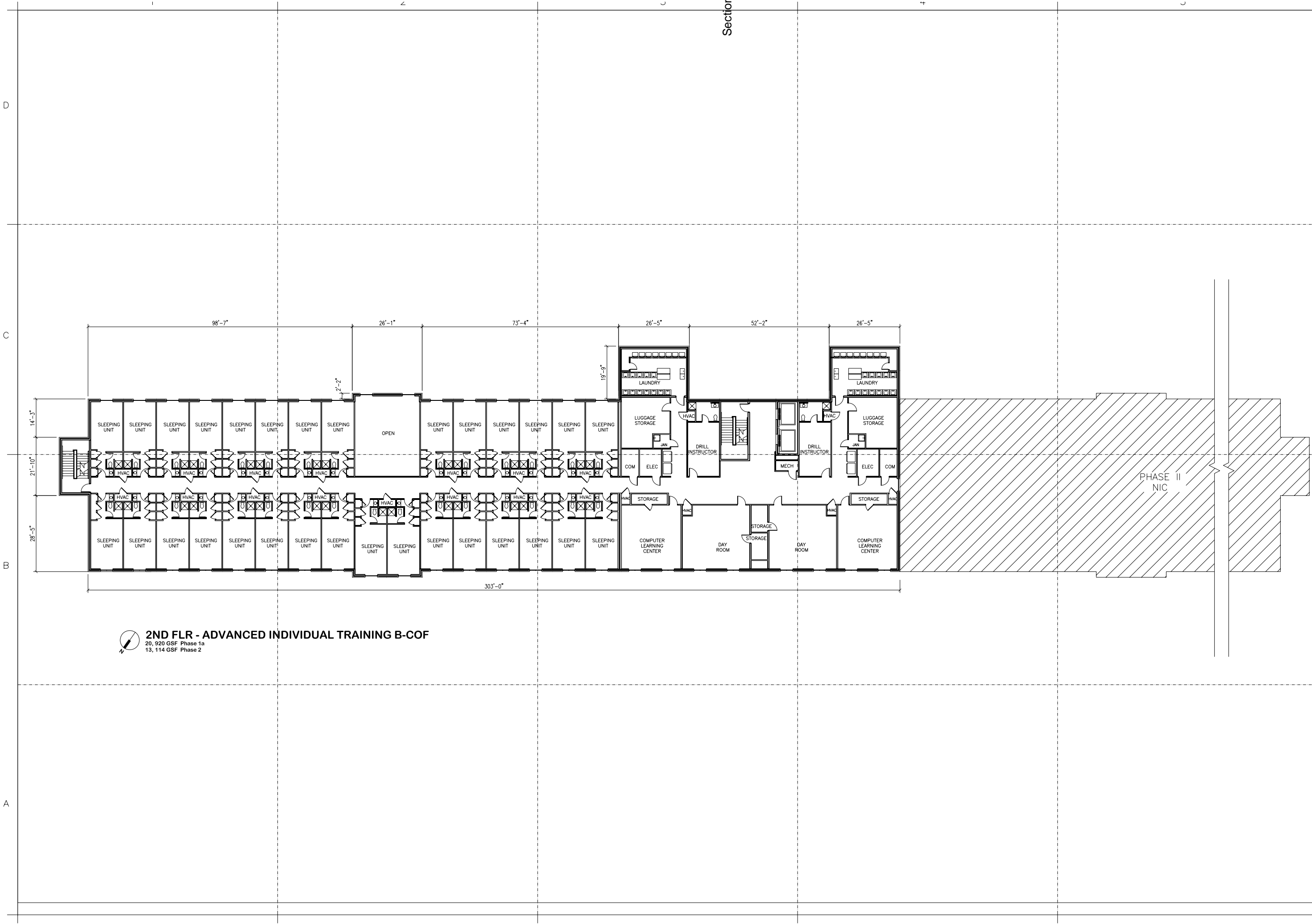
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ENGINEERING/  
CONSTRUCTION DIVISION  
DESIGN BRANCH

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BARRACKS COMPANY OPERATIONS FACILITY  
PN:36113

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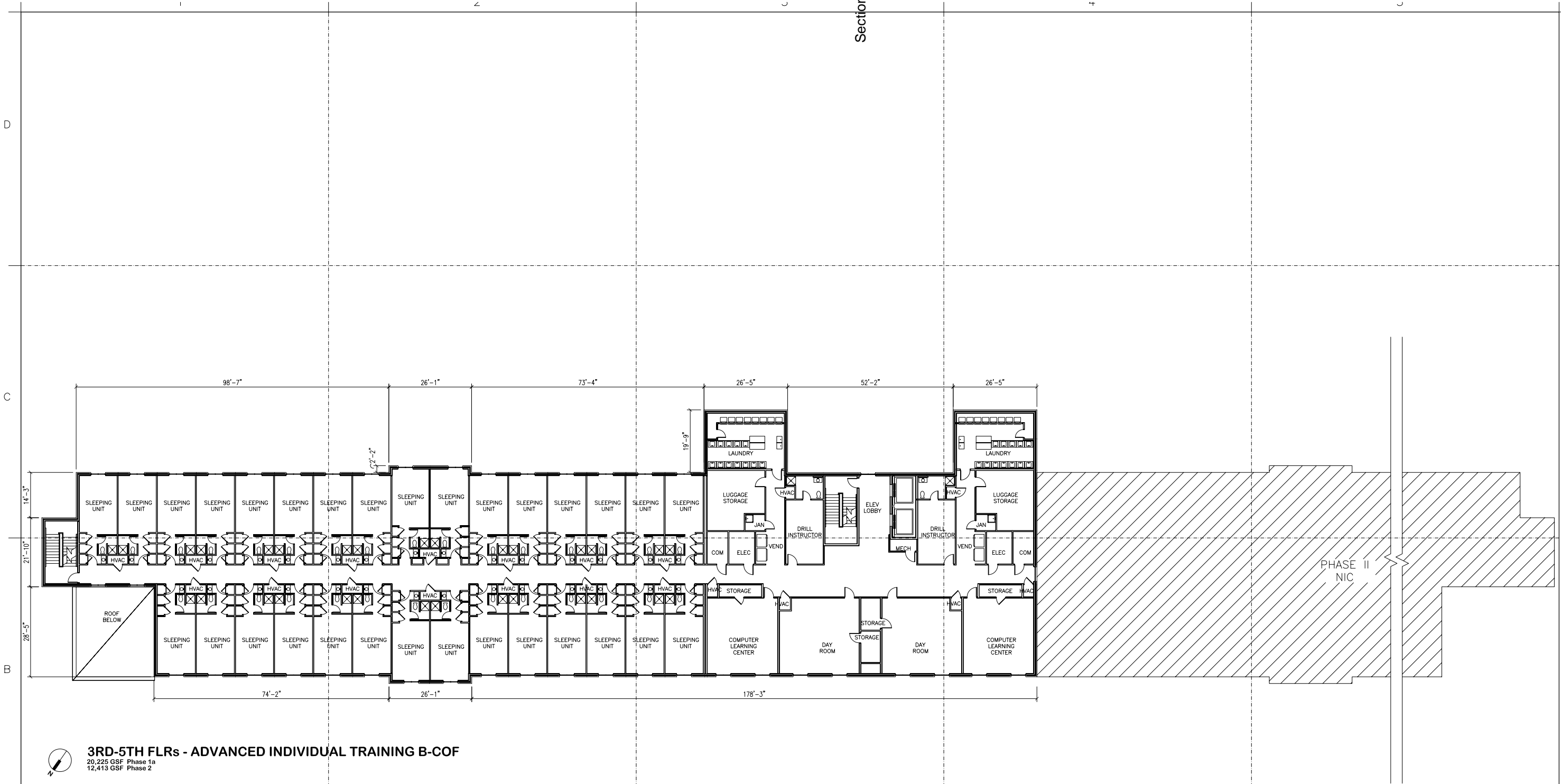
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PN-36113

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## Section:



**ADVANCED INDIVIDUAL TRAINING B-COF RENDERED PERSPECTIVE (Similar)**



### ADVANCED INDIVIDUAL TRAINING B-COF RENDERED SIDE ELEVATIONS (Similar)



**ADVANCED INDIVIDUAL TRAINING B-COF RENDERED FRONT ELEVATION (Similar)**



S Army Corps  
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ENGINEERING/ CONSTRUCTION DIVISION DESIGN BRANCH	Reviewed by:	Contr. No.	Submitted by: <b>ALA</b> Checked by: <b>ALA</b> Chief, Architectural Section: <b>ALA</b> Date: <b>ALA</b> Plot date: <b>ALA</b> Plot scale: <b>ALA</b>
	Dwn by:	04-26-10	

PORT LEE, VIRGINIA  
ADVANCED INDIVIDUAL TRAINING  
BARRACKS COMPANY OPERATIONS FACILITY  
PN:36113

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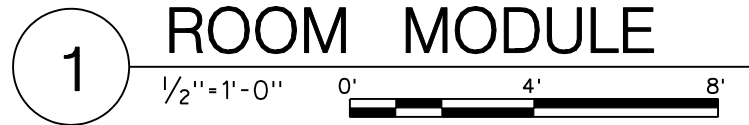
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NOTE: SEE SHEET E-402  
FOR ELECTRICAL PLANS

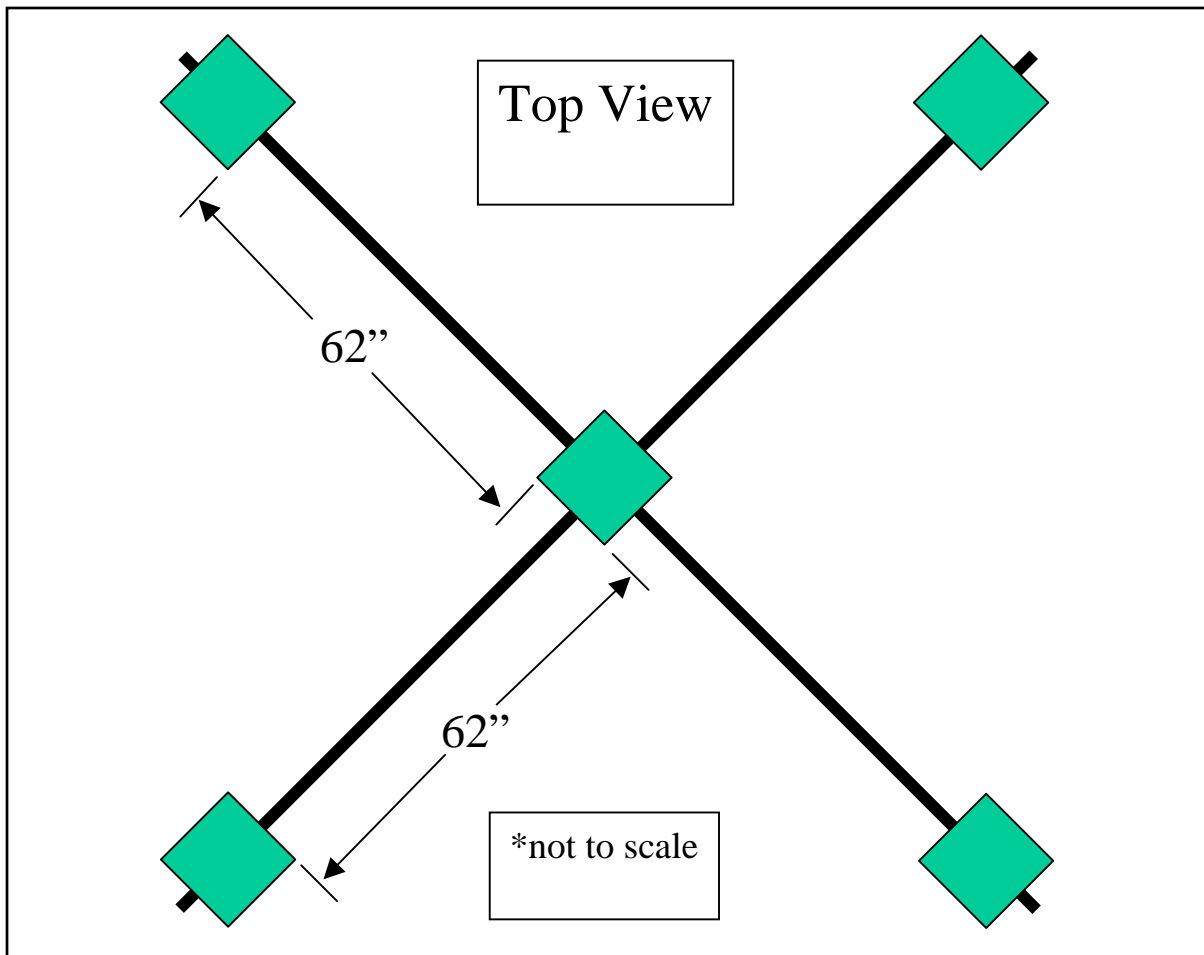


**APPENDIX B**

**Climbing Bars**



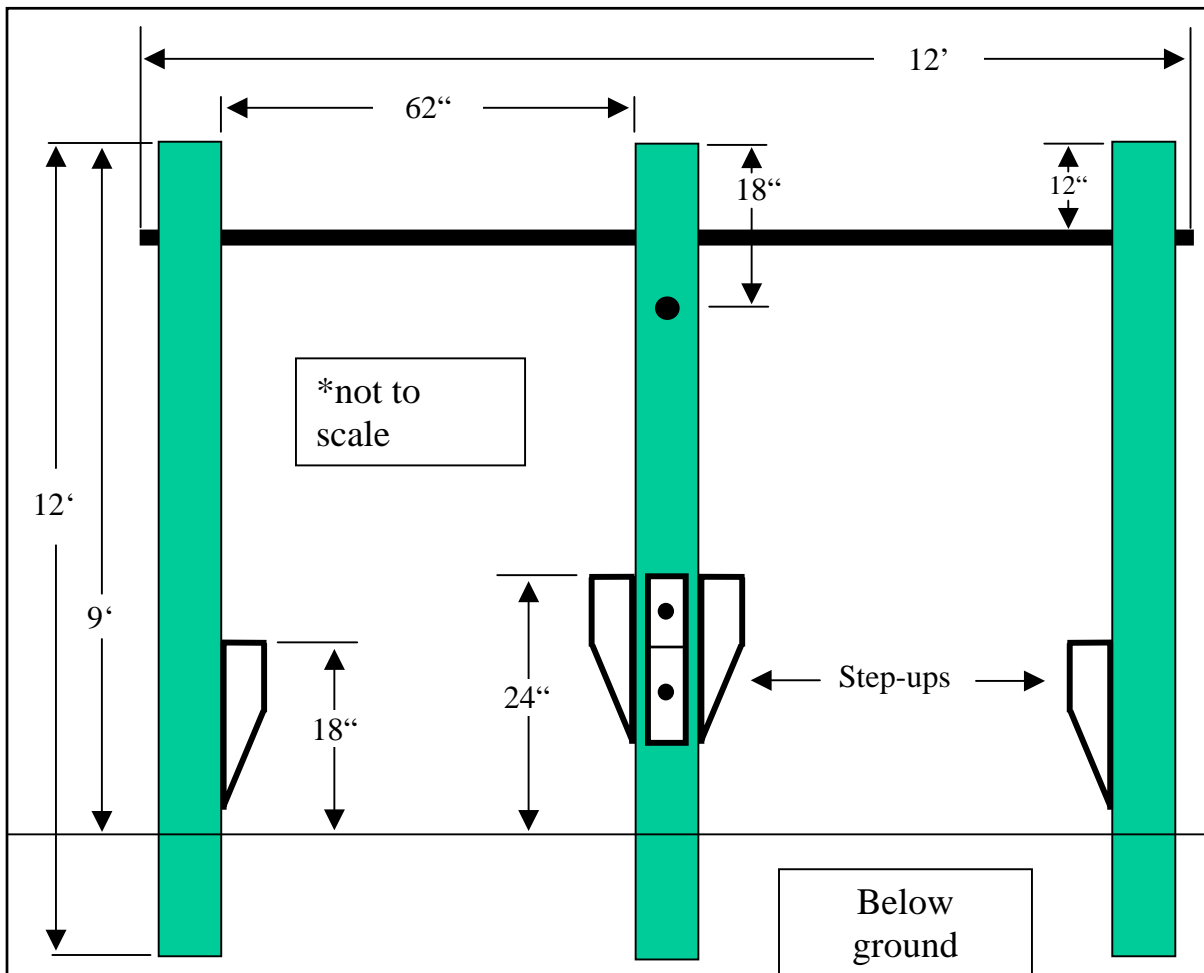
**Figure B-1.**

**Climbing Bars Specifications****Figure B-2.**

The specifications for the climbing bars are as follows:

- ❑ The posts (5) are 6" x 6" x 12' and sunk 3 feet into the ground, anchored with concrete.
- ❑ The bars (2) are threaded water pipe, 1.0 inch inside diameter, 12 feet long with 1-inch end caps (4).
- ❑ The bars are through the 6x6s at 7.5 and 8 feet above the ground.
- ❑ The distance from inside post edge to inside post edge is approximately 62 inches (refer to Figure B-2). This is to allow enough bar space to conduct all exercises safely.
- ❑ The step-ups (16 inches long) are cut from 4" x 4" x 8' posts and secured to the 6x6s with 3 inch screws that are counter sunk.
- ❑ The step-ups on the outside 6x6 posts are 18 inches from the ground, the step-ups on the inside post are 24 inches above the ground (refer to Figure DB-3).



**Figure B-3.**

The following planning considerations apply:

- ❑ Climbing bars provide adequate space and facilitate better command and control than traditional pull-up bars. Traditional pull-up bars are too narrow to safely and efficiently conduct the climbing drills.
- ❑ Employment of multiple climbing bar “pods” as shown in Figure B-4 will allow for efficient mass training. The climbing drills require one bar for every three soldiers when performed as a single activity.
- ❑ The total ground surface area for four pods is only 625 square feet.
- ❑ Four pods will accommodate 16 stations x 3 soldiers per station for a total of 48 soldiers.
- ❑ Additional free-standing pods should be constructed to accommodate more soldiers.

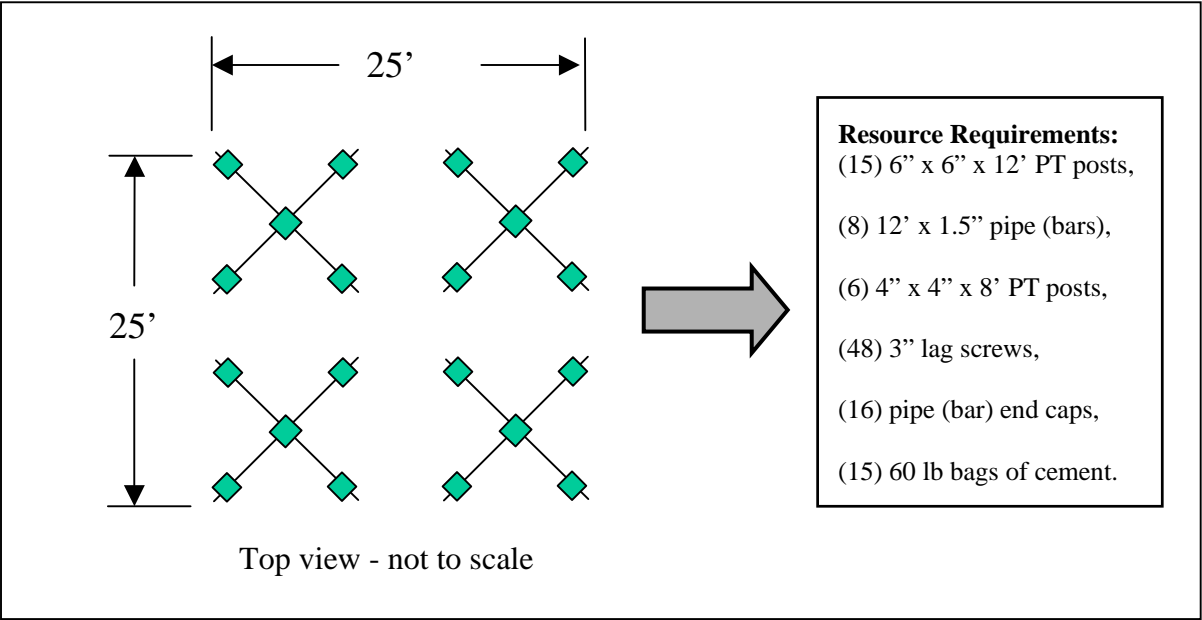
























FIGURE B-4.

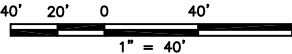


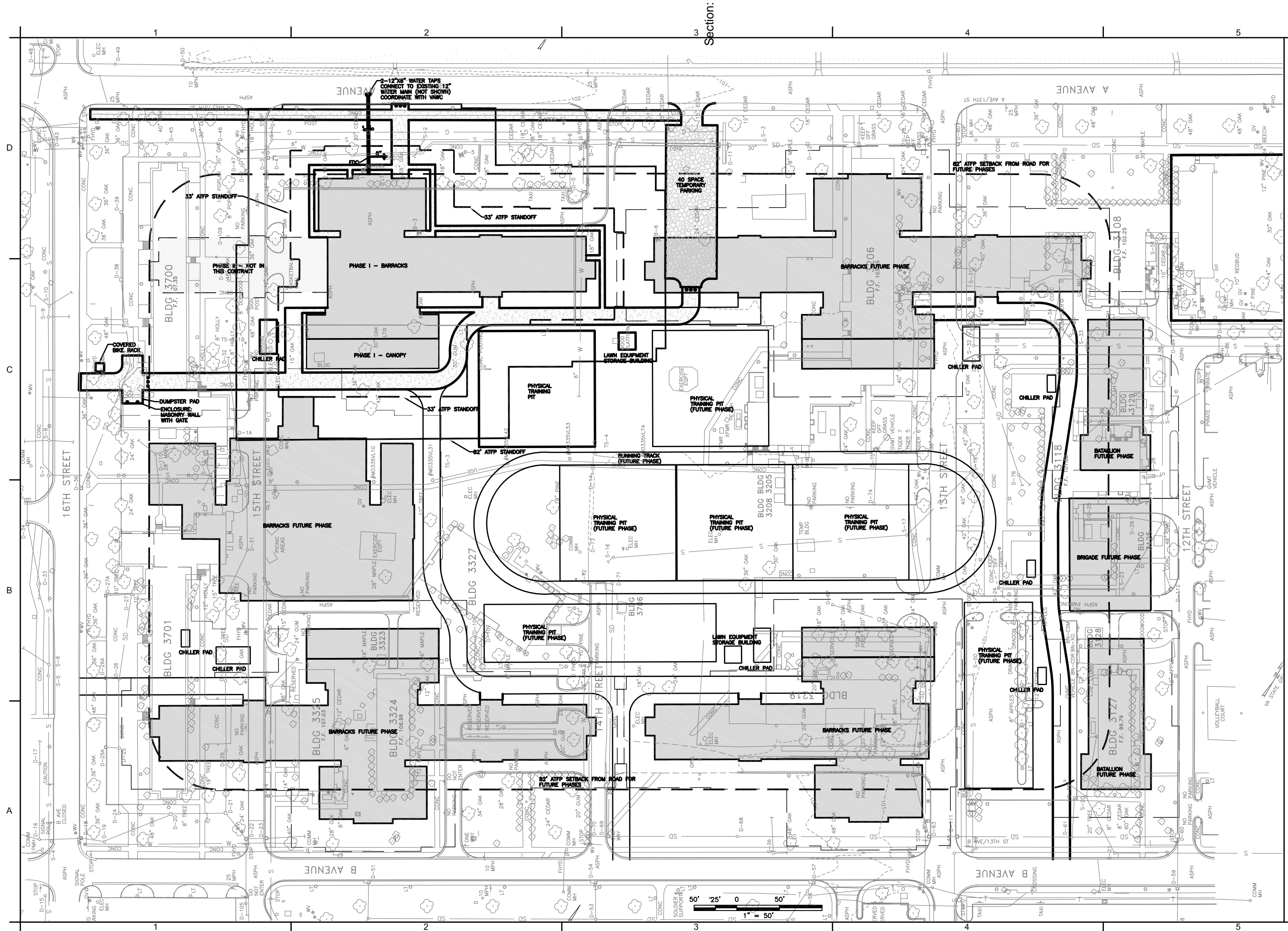




	PROJECT LIMITS
	ATFP LIMITS
	BOLLARD
	FIRE HYDRANT
	ASPHALT
	CONCRETE
	GRAVEL
	PERVIOUS PAVERS
	RIPRAP
	ARTIFICIAL TURF
	CLEANOUT
	MAN HOLE
	DROP INLET
	GAS VALVE
	WATER TAP
	METER
	SIGN
	LIGHT POLE
	GAS LINE
	WATER LINE
	SANITARY LINE
	STORM DRAIN LINE

ATFP	ANTI-TERRORISM FORCE PROTECTION
APPROX	APPROXIMATE
C&G	CURE AND GUTTER
CO	CLEANOUT
COMM	COMMUNICATIONS
DI	DROP INLET
ELEC	ELECTRIC
FDC	FIRE DEPARTMENT CONNECTION
FFFE	FINISHED FLOOR ELEVATION
FH	FIRE HYDRANT
G	GAS MAIN OR SERVICE LINE
GEN	GENERATOR
GM	GAS METER
GV	GAS VALVE
HC	HANDICAPPED
LT	LIGHT
MH	MANHOLE
PIV	POST INDICATOR VALVE
S	SANITARY
SD	STORM DRAIN
W	WATER
WM	WATER METER
WW	WATER VALVE









Section: Appendix K. Utility Cost Information

## **APPENDIX K**

### **Utility Cost Information**

The following utility rates for this installation are provided for the purpose of performing life cycle cost calculations in response to this solicitation for design development in accordance with Section 01 33 16 Design After Award:

**Electrical:**

Virginia Dominion Power Rates are included in the attached Rate Schedules.

**Natural Gas:**

Columbia Gas Rates are tabulated in the attached tariff tables.

**Water:**

Prince George County special water district rates are the actual cost of the water as provided by Virginia American Water Company plus 10%. Currently the VAWCO rate is in the \$4.95 per 1,000 gallons.

The connection fee for 5,000 gallons per day of water would be \$21,750.

Source: Prince George County

**Sewer:**

The rate for sanitary sewer discharge to the Hopewell Regional Treatment Facility sewer system is \$2.75 per 1,000 gallons, based on metered water usage.

Source: Arlene Day, Fort Lee



Virginia Electric and Power Company  
 N:\Rates\Retail Rate Schedules\Virginia Jurisdiction\Currently Approved\Rate Schedules\Bundled\SchGS1

## Schedule GS-1

### SMALL GENERAL SERVICE

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#### I. APPLICABILITY

Except as modified herein, this schedule is applicable only to a non-residential Customer who elects to receive Electricity Supply Service and Electric Delivery Service from the Company and who has no more than two billing months with a peak measured demand of 30 kW or more within the current and previous 11 billing months.

At such time the Customer no longer meets the above applicability requirement, the Customer will remain on this schedule for the period (not exceeding two additional billing months) required to achieve an orderly transfer to the applicable schedule.

This schedule is applicable to the supply of direct current electricity to any nonresidential Customer.

#### II. MONTHLY RATE

##### A. Distribution Service Charges

1. Basic Customer Charge
 

For Single-phase Service	\$11.47 per billing month
For Three-phase Service	\$15.47 per billing month
2. Plus Distribution kWh Charge
 

First 1,400 kWh	@	1.805¢ per kWh
Over 1,400 kWh	@	1.082¢ per kWh

##### B. Electricity Supply Service Charges

1. Electricity Supply kWh Charge
  - a. For the Billing Months of June – September
 

First 1,400 kWh	@	3.934¢ per kWh
Over 1,400 kWh	@	5.207¢ per kWh
  - b. For the Billing Months of October – May
 

First 1,400 kWh	@	3.934¢ per kWh
Over 1,400 kWh	@	2.612¢ per kWh
2. Each Electricity Supply kilowatthour used is subject to Fuel Charge Rider A.

(Continued)

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 Electric-Virginia

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 After 01-01-04. This Filing Effective For  
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Wednesday, June 16, 2010

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## Schedule GS-1

### SMALL GENERAL SERVICE

---

#### II. MONTHLY RATE (Continued)

- C. When direct current electricity is supplied to the Customer a surcharge of 15 percent will be added to the above charges.
- D. The minimum Distribution Service Charge shall be the highest of:
  - 1. The Basic Customer Charge in Paragraph II.A.1.
  - 2. The amount as may be contracted for.
  - 3. The sum of the charges in Paragraphs II.A. through II.C., above, plus \$1.480 multiplied by the number of kW by which any minimum demand established exceeds the demand determined under Paragraph III.
  - 4. If the demand determined under Paragraph III. is 50 kW or greater, the minimum charge shall not be less than \$3.13 per kW of demand determined.

#### III. DETERMINATION OF DEMAND

- A. A kW demand meter will be installed when the Customer has used 3,000 kWh or more in any billing month, when the Customer's estimated demand is greater than 25 kW, or when the Customer has contracted for standby, maintenance, or parallel operation service.
- B. The kW of demand will be determined as the highest average kW load measured in any 30-minute interval during the billing month.

#### IV. MINIMUM DEMAND

The minimum demand shall be such as may be contracted for, however;

- A. When the kW demand determined has reached or exceeded 500 kW during the current or preceding eleven billing months, the minimum demand shall not be less than the highest demand determined during the current and previous eleven billing months.

(Continued)

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## Schedule GS-1

### SMALL GENERAL SERVICE

---

#### IV. MINIMUM DEMAND (Continued)

- B. When the Customer's power factor is less than 85 percent, a minimum demand of not less than 85 percent of the Customer's maximum kVA demand may be established.

#### V. METER READING AND BILLING

- A. Meters may be read in units of 10 kWh and bills rendered accordingly.
- B. The Company shall have the option of reading meters monthly or bimonthly. When the meter is read at other than monthly intervals, the Company may render an interim monthly bill based on estimated kWh use during periods for which the meter was not read.
- C. When bills are calculated for a bimonthly period, the Basic Customer Charge shall be multiplied by two; the number of kWh specified in the initial block of the Distribution kWh Charge and the Electricity Supply kWh Charge shall be multiplied by two before the rates per kWh are applied to the usage for the bimonthly period; the minimum Distribution Service Charge shall be multiplied by two; and the charge specified in Paragraph VII.C. shall be multiplied by two.

#### VI. UNMETERED SERVICE

- A. The Company may, at its sole discretion, provide unmetered service when the Company determines the characteristics of the service location are highly unsuitable for the placement of a meter. Impracticality may be caused by difficult or dangerous meter access, high potential for vandalism, etc.
- B. The monthly kWh usage for unmetered services shall be determined by multiplying the connected load by the hours of operation in a month.
- C. The monthly charge for unmetered service, except for services qualifying under Paragraph VI.D. below will include the charge in Paragraph II.A.1. less \$2.00 per billing month, plus the unmetered kWh usage as determined in VI.B. above multiplied by the charges contained in Paragraphs II.A.2., II.B.1., and II.B.2.

(Continued)

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### Schedule GS-1

#### SMALL GENERAL SERVICE

---

#### VI. UNMETERED SERVICE (Continued)

- D. The monthly charge for unmetered services connected to a Company street lamp photocell receptacle through the use of an adapter will include the charge in Paragraph II.A.1. less \$4.00 per billing month, plus the unmetered kWh usage as determined in VI.B. above multiplied by the charges contained in Paragraphs II.A.2., II.B.1., and II.B.2. This service will be available only at the convenience of the Company and through agreement between the Company and the Customer for communication devices that are not interconnected with other communication facilities via communications wiring or optical fiber.
- E. Each point of connection shall be considered as a unique Customer and shall receive separately calculated bill amounts.

#### VII. STANDBY, MAINTENANCE OR PARALLEL OPERATION SERVICE

A Customer requiring standby, maintenance or parallel operation service may elect service under this schedule provided the Customer contracts for the maximum kW which the Company is to supply. Standby, maintenance or parallel operation service is subject to the following provisions:

- A. Suitable relays and protective apparatus shall be furnished, installed, and maintained at the Customer's expense in accordance with specifications furnished by the Company. The relays and protective equipment shall be subject, at all reasonable times, to inspection by the Company's authorized representative.
- B. In case the maximum kW demand determined in Paragraph III. or the minimum demand determined in Paragraph IV. exceeds the contract demand, the contract demand shall be increased by such excess demand.
- C. In addition to the charges in Paragraph II. the Customer will be charged an amount equal to \$4.717 multiplied by the number of kW by which the contract demand exceeds the demand determined in Paragraph III.

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Schedule GS-1

SMALL GENERAL SERVICE

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(Continued)

VIII. TERM OF CONTRACT

The contract shall be open order unless (a) standby, maintenance or parallel operation service is provided, or (b) the Customer or the Company requests a written contract. In such cases, the term of contract for the purchase of electricity under this schedule shall be as mutually agreed upon, but for not less than one year. During the minimum term of applicability, the Customer may be billed under the corresponding Unbundled Rate Schedule GS-1U, if applicable.

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## Schedule GS-2 INTERMEDIATE GENERAL SERVICE

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### I. APPLICABILITY

Except as modified herein, this schedule is applicable only to a non-residential Customer who elects to receive Electricity Supply Service and Electric Delivery Service from the Company and who has within the current and previous 11 billing months at least three peak measured demands of 30 kW or more and not more than two peak measured demands of 500 kW or more.

For a Customer served under this schedule whose peak measured demand has decreased to less than 30 kW, this schedule shall remain applicable to the Customer and the Customer shall not have the option to purchase electricity under Schedule GS-1 until such time the maximum measured demand has remained at less than 30 kW during all billing months within the current and previous 11 billing months.

At such time the Customer no longer meets the above applicability requirements, the Customer will remain on this schedule for the period (not exceeding two additional billing months) required to achieve an orderly transfer to the applicable schedule.

For new service, this schedule is applicable when the anticipated kW demand meets the above criteria.

### II. 30-DAY RATE

#### A. Non-Demand Billing

##### 1. Distribution Service Charges

###### a. Basic Customer Charge

Basic Customer Charge \$21.17 per billing month.

###### b. Plus Distribution kWh Charge

All kWh	@	2.433¢ per kWh
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##### 2. Electricity Supply Service Charges

###### a. Electricity Supply kWh Charge

###### 1) For the billing months of June – September

All kWh	@	4.795¢ per kWh
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###### 2) For the billing months of October – May

All kWh	@	4.075¢ per kWh
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Electric-Virginia

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After 01-01-04. This Filing Effective For  
Usage On and After 07-01-07.

Wednesday, June 16, 2010

Virginia Electric and Power Company

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Schedule GS-2  
INTERMEDIATE GENERAL SERVICE

(Continued)

II. 30-DAY RATE (Continued)

2. Electricity Supply Service Charges (Continued)

- b. Each Electricity Supply kilowatthour used is subject to Fuel Charge Rider A.

B. Demand Billing

1. Distribution Service Charges

- a. Basic Customer Charge  
Basic Customer Charge \$21.17 per billing month.
- b. Distribution Demand Charge  
All kW of Demand @ \$ 3.387 per kW

2. Electricity Supply Service Charges

- a. Electricity Supply Demand Charge
- 1) For the billing months of June – September  
All kW of Demand @ \$ 2.844 per kW
- 2) For the billing months of October – May  
All kW of Demand @ \$1.406 per kW
- b. Plus Electricity Supply kWh Charge
- |                      |   |                |
|----------------------|---|----------------|
| First 150 kWh per kW | @ | 4.617¢ per kWh |
| Next 150 kWh per kW  | @ | 2.588¢ per kWh |
| Next 150 kWh per kW  | @ | 1.119¢ per kWh |
| Additional kWh       | @ | 0.272¢ per kWh |
- c. Each Electricity Supply kilowatthour used is subject to Fuel Charge Riders A and B.

(Continued)

Filed 06-28-07  
Electric-Virginia

Superseding Filing Effective For Usage On and  
After 01-01-04. This Filing Effective For  
Usage On and After 07-01-07.

Wednesday, June 16, 2010

Virginia Electric and Power Company  
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Schedule GS-2  
INTERMEDIATE GENERAL SERVICE

(Continued)

II. 30-DAY RATE (Continued)

C. The minimum charge shall be the highest of:

1. The Basic Customer Charge in Paragraph II.A.1.a. or II.B.1.a., whichever is applicable.
2. The amount as may be contracted for.
3. The sum of the charges in Paragraph II.A. or II.B., whichever is applicable, plus \$1.480 multiplied by the number of kW by which any minimum demand established exceeds the demand determined under Paragraph IV.
4. If the demand determined under Paragraph IV is 50 kW or greater, the minimum charge for Non-Demand Billing under Paragraph II. A. shall not be less than \$3.13 per kW of demand determined.

III. NON-DEMAND BILLING VS. DEMAND BILLING

- A. The non-demand billing charges of Paragraph II.A. apply to customers whose kWh usage for the current month does not exceed 200 kWh per kW of the demand as determined under Paragraph IV.
- B. The demand billing charges of Paragraph II.B. apply to customers whose kWh usage for the current month exceeds 200 kWh per kW of the demand as determined under Paragraph IV.

IV. DETERMINATION OF DEMAND

The kW of demand will be determined as the highest average kW load measured in any 30-minute interval during the billing month.

V. MINIMUM DEMAND

The minimum demand shall be such as may be contracted for, however:

- A. When the kW demand determined has reached or exceeded 500 kW during the current or preceding eleven billing months, the minimum demand shall not be less than the highest demand determined during the current and previous eleven billing months.

(Continued)

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## Virginia Electric and Power Company

N:\Rates\Retail Rate Schedules\Virginia Jurisdiction\Currently Approved\Rate Schedules\Bundled\SchGS2

Schedule GS-2  
INTERMEDIATE GENERAL SERVICE

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(Continued)

## V. MINIMUM DEMAND (Continued)

- B. When the Customer's power factor is less than 85 percent, a minimum demand of not less than 85 percent of the Customer's maximum kVA demand may be established.

## VI. METER READING AND BILLING

- A. Meters may be read in units of 10 kWh and bills rendered accordingly.
- B. When the actual number of days between meter readings is more or less than 30 days, the Basic Customer Charge, the Distribution Demand Charge, the Electricity Supply Demand, the quantity of kWh in the first three blocks of the Demand Billing Electricity Supply kWh Charge and the minimum charge of the 30-day rate will each be multiplied by the actual number of days in the billing period and divided by 30.

## VII. STANDBY, MAINTENANCE OR PARALLEL OPERATION SERVICE

A Customer requiring standby, maintenance or parallel operation service may elect service under this schedule provided the Customer contracts for the maximum kW which the Company is to supply. Standby, maintenance or parallel operation service is subject to the following provisions:

- A. Suitable relays and protective apparatus shall be furnished, installed, and maintained at the Customer's expense in accordance with specifications furnished by the Company. The relays and protective equipment shall be subject, at all reasonable times, to inspection by the Company's authorized representative.
- B. In case the maximum kW demand determined in Paragraph IV. or the minimum demand determined in Paragraph V. exceeds the contract demand, the contract demand shall be increased by such excess demand.
- C. The demand billed under Paragraph II.B.2.a.1) or II.B.2.a.2) shall be the contract demand.

Virginia Electric and Power Company

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Schedule GS-2  
INTERMEDIATE GENERAL SERVICE

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(Continued)

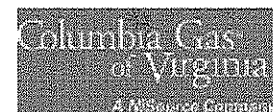
## VIII. TERM OF CONTRACT

The contract shall be open order unless (a) standby, maintenance or parallel operation service is provided, or (b) the Customer or the Company requests a written contract. In such cases, the term of contract for the purchase of electricity under this schedule shall be as mutually agreed upon, but for not less than one year. During the minimum term of applicability, the Customer may be billed under the corresponding Unbundled Rate Schedule GS-2U, if applicable.

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Electric-Virginia

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After 01-01-04. This Filing Effective For  
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Wednesday, June 16, 2010

[Manage Your Home Account](#)[Newsroom](#)[Home](#) :: [My\\_account](#) :: Columbia Gas of Virginia - Rate information

8:48:09 on Friday, 8th May 2009

## My account

[My account home](#)  
[Our current rates](#)  
[How to read your gas bill](#)  
[Bill payment options](#)  
[How to read your own meter](#)  
[Visit the Energy Store](#)  
[Tariff](#)

## Contact us

Columbia Gas of Virginia  
DirectLink 1-800-543-8911  
24-HOUR EMERGENCY  
RESPONSE: 1-800-544-5606  
(gas leak, odor of gas, carbon  
monoxide symptoms)

## Rate information effective March 2, 2009.

- [Residential Service \(RS\) Rates](#)
- [Residential Transportation Service \(RTS\) Rates \(Customer Choice Program\)](#)
- [Small General Service \(SGS\) Rates \(Small Commercial\)](#)
- [Small General Transportation Service \(SGTS\) Rates \(Customer Choice Program\) \(Small Commercial\)](#)
- [Large General Service \(LGS\) \(Large Commercial and Industrial\)](#)
- [Columbia Gas of Virginia tariff](#)

**1 Ccf = 100 cubic feet of natural gas = 100,000 BTU's**

### Residential Service (RS) Rates

Residential Sales Service (RS) (for customers that were **not** on Residential Transportation Service (RTS) in the last 12 months):

**\$1.2817** per Ccf for the first 50 Ccf of each month  
**\$1.2729** per Ccf for the next 450 Ccf of each month  
**\$1.2601** per Ccf for the remaining Ccf used in each month  
**\$12.25** per month customer charge

Residential Sales Service (RS) (for customers that were on Residential Transportation Service (RTS) in the last 12 months):

**\$1.2612** per Ccf for the first 50 Ccf of each month  
**\$1.2524** per Ccf for the next 450 Ccf of each month  
**\$1.2396** per Ccf for the remaining Ccf used in each month  
**\$12.25** per month customer charge

**NOTE:** Customers currently participating in the Customer Choice Program, please see the Customer Choice - Residential Transportation Service section below.

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### Residential Transportation Service (RTS) Rates (Customer Choice Program)

CGV customers are eligible to participate in the [Customer Choice Program](#) enabling customers to choose their gas supplier. Customers choosing an alternative supplier pay the following service and delivery charge rates to Columbia Gas of Virginia. These rates do not include the gas costs from the supplier.

Residential Transportation Service (RTS) (for customers that were **not** on Residential Sales Service (RS) in the last 12 months):

**\$0.4471** per Ccf for the first 50 Ccf of each month  
**\$0.4383** per Ccf for the next 450 Ccf of each month  
**\$0.4255** per Ccf for the remaining Ccf used in each month.  
**\$12.25** per month customer charge

**Price to compare (as of March 2, 2009) = \$0.8141 per Ccf for all rate blocks.**

Residential Transportation Service (RTS) (for customers that were on Residential Sales Service (RS) in the last 12 months):

**\$0.4676** per Ccf for the first 50 Ccf of each month  
**\$0.4588** per Ccf for the first 450 Ccf of each month

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**\$0.4460** per Ccf for the remaining Ccf used in each month.  
**\$12.25** per month customer charge

**Price to compare (as of March 2, 2009) = \$0.8141 per Ccf for all rate blocks.**

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**Small General Service (SGS) Rates (Small Commercial)**

Small General Service (SGS) (for customers that were **not** on Small General Transportation Service (SGTS) in the last 12 months):

**\$1.0975** per Ccf for the first 200 Ccf of each month  
**\$1.0844** per Ccf for the next 800 Ccf of each month  
**\$1.0808** per Ccf for the next 9000 Ccf of each month  
**\$1.0747** per Ccf for the next 15,000 Ccf of each month  
**\$1.0714** per Ccf for the remaining Ccf used in each month  
**\$23.25** per month customer charge

Small General Service (SGS) (for customers that were on Small General Transportation Service (SGTS) in the last 12 months):

**\$1.1032** per Ccf for the first 200 Ccf of each month  
**\$1.0901** per Ccf for the next 800 Ccf of each month  
**\$1.0865** per Ccf for the next 9000 Ccf of each month  
**\$1.0804** per Ccf for the next 15,000 Ccf of each month  
**\$1.0771** per Ccf for the remaining Ccf used in each month  
**\$23.25** per month customer charge

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**Small General Transportation Service (SGTS) Rates (Customer Choice Program) (Small Commercial)**

All customers are eligible to participate in the Customer Choice Program enabling customers to choose their gas supplier. Customers choosing an alternative supplier pay the following service and delivery charge rates to Columbia Gas of Virginia. These rates do not include the gas costs from the supplier.

Small General Transportation Service (SGTS) (for customers that were **not** on Small General Service (SGS) in the last 12 months):

**\$0.3444** per Ccf for the first 200 Ccf of each month  
**\$0.3313** per Ccf for the next 800 Ccf of each month  
**\$0.3277** per Ccf for the next 9000 Ccf of each month  
**\$0.3216** per Ccf for the next 15,000 Ccf of each month  
**\$0.3183** per Ccf for the remaining Ccf used in each month  
**\$23.25** per month customer charge

**Price to compare (as of March 2, 2009) = \$0.7588 per Ccf for all rate blocks.**

Small General Transportation Service (SGTS) (for customers that were on Small General Service (SGS) in the last 12 months):

**\$0.3387** per Ccf for the first 200 Ccf of each month  
**\$0.3256** per Ccf for the next 800 Ccf of each month  
**\$0.3220** per Ccf for the next 9000 Ccf of each month  
**\$0.3159** per Ccf for the next 15,000 Ccf of each month  
**\$0.3126** per Ccf for the remaining Ccf used in each month  
**\$23.25** per month customer charge

**Price to compare (as of March 2, 2009) = \$0.7588 per Ccf for all rate blocks.**

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**Large General Service (LGS) (Large Commercial and Industrial)**

Columbia Gas of Virginia is an open access system and offers a variety of rate structures for our large volume customers. These options enable our customers to choose the most valuable service according to their needs.

Rates can be found in the Columbia Gas of Virginia tariff, starting on sheet number 3.

If you are an existing customer in Columbia Gas of Virginia's territory, visit our business and industry services pages to learn about services specific to your needs. There you will find answers to your questions regarding rates, transportation service and other energy options.

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### LEED Project Credit Guidance

This spreadsheet indicates Army required credits, Army preferred credits, project-specific ranking of individual point preferences, assumptions guidance for individual credits, and references to related language in the RFP for individual credits.

LEED 2.2 Credit Paragraph	LEED Project Credit Guidance	Army Guidance: Required - Preferred - Avoid		Project Preference Ranking: (1=most preferred, blank=no preference, X=preference not applicable to this credit, Rqd=required)	
PAR	FEATURE	REMARKS			
SUSTAINABLE SITES					
SSPR1	Construction Activity Pollution Prevention (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met.	
SS1	Site Selection		X	See paragraph LEED CREDITS COORDINATION for information relating to this credit.	

SS2	Development Density & Community Connectivity - OPTION 1 DENSITY		X	See paragraph LEED CREDITS COORDINATION for information relating to this credit.
	Development Density & Community Connectivity - OPTION 2 CONNECTIVITY		X	See paragraph LEED CREDITS COORDINATION for information relating to this credit.
SS3	Brownfield Redevelopment		X	See paragraph LEED CREDITS COORDINATION for information relating to this credit.
SS4.1	Alternative Transportation: Public Transportation Access		X	See paragraph LEED CREDITS COORDINATION for information relating to this credit.
SS4.2	Alternative Transportation: Bicycle Storage & Changing Rooms	Pref		Assume that non-transient building occupants are NOT housed on Post unless indicated otherwise.
SS4.3	Alternative Transportation: Low Emitting & Fuel Efficient Vehicles - OPTION 1			Requires provision of vehicles, which cannot be purchased with construction funds. Assume Government will not provide vehicles unless indicated otherwise. Assume that 50% of GOV fleet is NOT alternative fuel vehicles unless indicated otherwise.
SS4.3	Alternative Transportation: Low Emitting & Fuel Efficient Vehicles - OPTION 2	Pref		
SS4.3	Alternative Transportation: Low Emitting & Fuel Efficient Vehicles - OPTION 3			Requires provision of vehicle refueling stations. Installation must support type of fuel and commit to maintaining/supporting refueling stations.
SS4.4	Alternative Transportation: Parking Capacity	Pref		

SS5.1	Site Development: Protect or Restore Habitat			
SS5.2	Site Development: Maximize Open Space	Pref		Assume AGMBC option for aggregated open space at another location on the installation is not available to the project unless indicated otherwise.
SS6.1	Stormwater Design: Quantity Control	Pref		See paragraph STORMWATER MANAGEMENT.
SS6.2	Stormwater Design: Quality Control	Pref		See paragraph STORMWATER MANAGEMENT.
SS7.1	Heat Island Effect: Non-Roof			
SS7.2	Heat Island Effect: Roof	Pref		Coordinate with nearby airfield requirements, which may preclude this credit.
SS8	Light Pollution Reduction	Pref		
<b><u>WATER EFFICIENCY</u></b>				
WEPR1	Water Use Reduction (Version 3 only)	Rqd	Rqd	All LEED prerequisites are required to be met.
WE1.1	Water Efficient Landscaping: Reduce by 50%	Pref		See paragraph IRRIGATION. Project must include landscaping to be eligible for this credit.
WE1.2	Water Efficient Landscaping: No Potable Water Use or No Irrigation	Pref		Project must include landscaping to be eligible for this credit.
WE2	Innovative Wastewater Technologies - OPTION 1			
WE2	Innovative Wastewater Technologies - OPTION 2			
WE3	Water Use Reduction	Pref		See paragraph BUILDING WATER USE REDUCTION.



<b>ENERGY AND ATMOSPHERE</b>				
EAPR1	Fundamental Commissioning of the Building Energy Systems (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met.
EAPR2	Minimum Energy Performance (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met.
EAPR3	Fundamental Refrigerant Management (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met.
EA1	Optimize Energy Performance	Rqd	1	Earning of LEED EA1 points as indicated in paragraph <b>ENERGY CONSERVATION</b> , as a minimum, is required..
EA2.1	On-Site Renewable Energy	Pref		See paragraph <b>ENERGY CONSERVATION</b> .
EA3	Enhanced Commissioning			The Commissioning Authority may be provided through the Design-Build Contractor only if in accordance with USGBC Credit Interpretation Ruling (CIR) dated 9/15/06. Commissioning Authority activities begin during design phase and continue well beyond beneficial occupancy. Assume Government will not provide CxA post-occupancy activities unless indicated otherwise.
EA4	Enhanced Refrigerant Management			
EA5	Measurement & Verification			Assume Government will not provide post-occupancy activities unless indicated otherwise.
EA6	Green Power		X	See paragraph <b>LEED CREDITS COORDINATION</b> for information relating to this credit.
<b>MATERIALS AND RESOURCES</b>				

MRPR1	Storage & Collection of Recyclables (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met. Installation provides collection service and outside receptacle needs coordination.
MR1	Building Reuse			
MR2.1	Construction Waste Management: Divert 50% From Disposal	Pref		See paragraph CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT.
MR2.2	Construction Waste Management: Divert 75% From Disposal	Pref		
MR3	Materials Reuse			
MR4.1	Recycled Content: 10% (post-consumer + 1/2 pre-consumer)	Pref		See paragraph RECYCLED CONTENT.
MR4.2	Recycled Content: 20% (post-consumer + 1/2 pre-consumer)	Pref		
MR5.1	Regional Materials:10% Extracted, Processed & Manufactured Regionally			
MR5.2	Regional Materials:20% Extracted, Processed & Manufactured Regionally			
MR6	Rapidly Renewable Materials	Pref		See paragraph BIOBASED AND ENVIRONMENTALLY PREFERABLE MATERIALS and

				paragraph FEDERAL BIOBASED PRODUCTS PREFERRED PROCUREMENT PROGRAM.
MR7	Certified Wood	Pref		See paragraph BIOBASED AND ENVIRONMENTALLY PREFERABLE MATERIALS.
<b><u>INDOOR ENVIRONMENTAL QUALITY</u></b>				
EQPR1	Minimum IAQ Performance (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met.
EQPR2	Environmental Tobacco Smoke (ETS) Control (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met. Assume all buildings are smoke free unless indicated otherwise. Family housing, barracks and other lodging are facility types where smoking may be permitted in some cases. If Statement of Work indicates smoking is permitted in these types of facilities, the requirements of LEED-NC 2.2 Option 3 apply.
EQ1	Outdoor Air Delivery Monitoring			
EQ2	Increased Ventilation			
EQ3.1	Construction IAQ Management Plan: During Construction	Pref		See paragraph CONSTRUCTION IAQ MANAGEMENT.
EQ3.2	Construction IAQ Management Plan: Before Occupancy	Pref		See paragraph CONSTRUCTION IAQ MANAGEMENT.
EQ4.1	Low Emitting Materials: Adhesives & Sealants	Pref		See paragraph LOW-EMITTING MATERIALS.
EQ4.2	Low Emitting Materials: Paints & Coatings	Pref		See paragraph LOW-EMITTING MATERIALS.
EQ4.3	Low Emitting Materials: Carpet/Flooring Systems	Pref		See paragraph LOW-EMITTING MATERIALS.

EQ4.4	Low Emitting Materials: Composite Wood & Agrifiber Products	Pref		See paragraph LOW-EMITTING MATERIALS.
EQ5	Indoor Chemical & Pollutant Source Control	Pref		System requiring weekly cleaning to earn this credit is not a permitted option for Army projects.
EQ6.1	Controllability of Systems: Lighting			
EQ6.2	Controllability of Systems: Thermal Comfort			
EQ7.1	Thermal Comfort: Design			
EQ7.2	Thermal Comfort: Verification			Project must earn credit EQ7.1 to be eligible for this credit. Assume Government will not provide post-occupancy activities unless indicated otherwise.
EQ8.1	Daylight & Views: Daylight 75% of Spaces	Pref		See paragraph DAYLIGHTING.
EQ8.2	Daylight & Views: Views for 90% of Spaces	Pref		
<b>INNOVATION &amp; DESIGN PROCESS</b>				
IDc1.1	Innovation in Design			See paragraph INNOVATION AND DESIGN CREDITS. Assume Government will not provide any activities associated with ID credits.
IDc1.2	Innovation in Design			
IDc1.3	Innovation in Design			
IDc1.4	Innovation in Design			
IDc2	LEED Accredited Professional	Rqd	Rqd	LEED AP during design and construction is required.
<b>REGIONAL PRIORITY CREDITS (Version 3 only)</b>				See paragraph LEED CREDITS COORDINATION for information relating to this.

APPENDIX M  
LEED Owner's Project Requirements

Not Used

APPENDIX N  
LEED Requirements for Multiple Contractor Combined Projects

Not Used

APPENDIX O  
LEED Strategy Tables

Not Used

## APPENDIX P

### USGBC Registration of Army Projects

#### Typical Registration Procedure

1. Complete the online registration form (see guidance below) at the USGBC website <http://www.usgbc.org/showfile.aspx?documentid=875> and submit it online.
2. Pay the registration fee via credit card (USACE staff: credit card PR&C is funded by project design or S&A funds).
3. The USGBC will follow up with a final invoice, the LEED-online passwords and template information.
4. If you have any questions, the USGBC contact (as of October 08) is:  
Courtney Yan, LEED Program Assistant  
U.S. Green Building Council  
202/587-7180  
[cyan@usgbc.org](mailto:cyan@usgbc.org)

#### Completing the Registration Form

##### **BEFORE YOU BEGIN:**

**Create a personal account with USGBC if you do not have one.**

**You will need the following information:**

**Project name as it appears in P2 (obtain from USACE Project Manager)**

**Building number/physical address of project**

**Zip code for Installation/project location**

**Total gross area all buildings in project**

**Total construction cost for buildings only (see Project Details Section instructions below)**

##### **ACCOUNT/LOGIN INFORMATION SECTION**

1. The person registering the project **must have an account with USGBC** (login and password) to complete the form. If you have an account, select "I already have a USGBC Web site account" and enter email and password (twice). If you do not have an account, you may select "Create a new USGBC website account" and follow the instructions. It is recommended that you create an account separately on the USGBC website before you start the form. **IMPORTANT:** USACE team members are members of USGBC and are eligible for Member prices. USACE team members registering projects should be sure to include the USACE Corporate Access ID on the form (if you do not have it contact [richard.l.schneider@usace.army.mil](mailto:richard.l.schneider@usace.army.mil) or [judith.f.milton@usace.army.mil](mailto:judith.f.milton@usace.army.mil) for the number).
2. The Account/Login Information section is filled out by the person registering the project. It may be a Contractor or a USACE staff member.

##### **PROJECT TYPE SECTION**

Self-explanatory. As of October 08 USACE projects use LEED for New Construction V2.2. USACE staff members are USGBC members.

##### **GENERAL PROJECT INFORMATION SECTION**

**Project Title:** Match the project name used in P2. Contact the USACE Project Manager for this information.

**Is Project Confidential:** Indicate NO except if project has security sensitivity (elements that are FOUO or higher security) indicate YES.

**Project Address 1 and 2:** This is the physical location of the project. Provide building number, street address, block number or whatever is known to best describe the location of the project on the Installation.

**Project City:** Installation Name

**State, Country, Zip Code:** Self-explanatory

**How Did You Hear About LEED:** USACE requirement



**PRIMARY CONTACT INFORMATION**

The Primary Contact may be a Contractor or a USACE staff member. USGBC considers this individual the primary point of contact for all aspects of the project. It is recommended this person be the Contractor Project Manager or the USACE Project Manager.

**PROJECT OWNER INFORMATION**

**Project Owner First Name, Last Name, email:** The Project Owner is the USACE Project Manager.

**Organization Name:** U.S. Army Corps of Engineers. This field **MUST** be completed this way because it will be used as a search field by higher HQ to find all USACE registered projects.

**PROJECT DETAILS**

**Owner Type:** Military Base

**Project Scope:** Provide brief description (example: barracks complex)

**Site Conditions:** Provide brief description (example: wooded with steep grades)

**Occupant Type:** Provide brief description (example: military and civilian employees)

**Owner Occupied:** No

**Gross Square Footage:** Provide total area all buildings in project

**Project Budget:** Do not include the cost for design, site work, demolition, abatement or other work – do not include Government contingency or supervision costs. For design-build and construction projects registered after award, use the awarded contract cost for construction of buildings only. For projects registered prior to award of design-build or construction contract, use the total Primary Facility cost from DD1391 or updated Primary Facility cost based on design development if available.

**Current Project Phase:** Identify phase at time of registration (example: design start, construction start)

**Project Type:** Self-explanatory

**PAYMENT INFORMATION**

Self-explanatory

**APPENDIX Q**  
**REV 1.1 – 31 MAY 2009**  
**AREA COMPUTATIONS**

**Computation of Areas:** Compute the "gross area" and "net area" of facilities (excluding family housing) in accordance with the following subparagraphs:

**(1) Enclosed Spaces:** The "gross area" is the sum of all floor spaces with an average clear height  $\geq 6'-11"$  (as measured to the underside of the structural system) and having perimeter walls which are  $\geq 4'-11"$ . The area is calculated by measuring to the exterior dimensions of surfaces and walls.

**(2) Half-Scope Spaces:** Areas of the following spaces shall count as one-half scope when calculating "gross area":

- Balconies
- Porches
- Covered exterior loading platforms or facilities
- Covered but not enclosed passageways and walks
- Open stairways (both covered and uncovered)
- Covered ramps
- Interior corridors (Unaccompanied Enlisted Personnel Housing Only)

**(3) Excluded Spaces:** The following spaces shall be excluded from the "gross area" calculation:

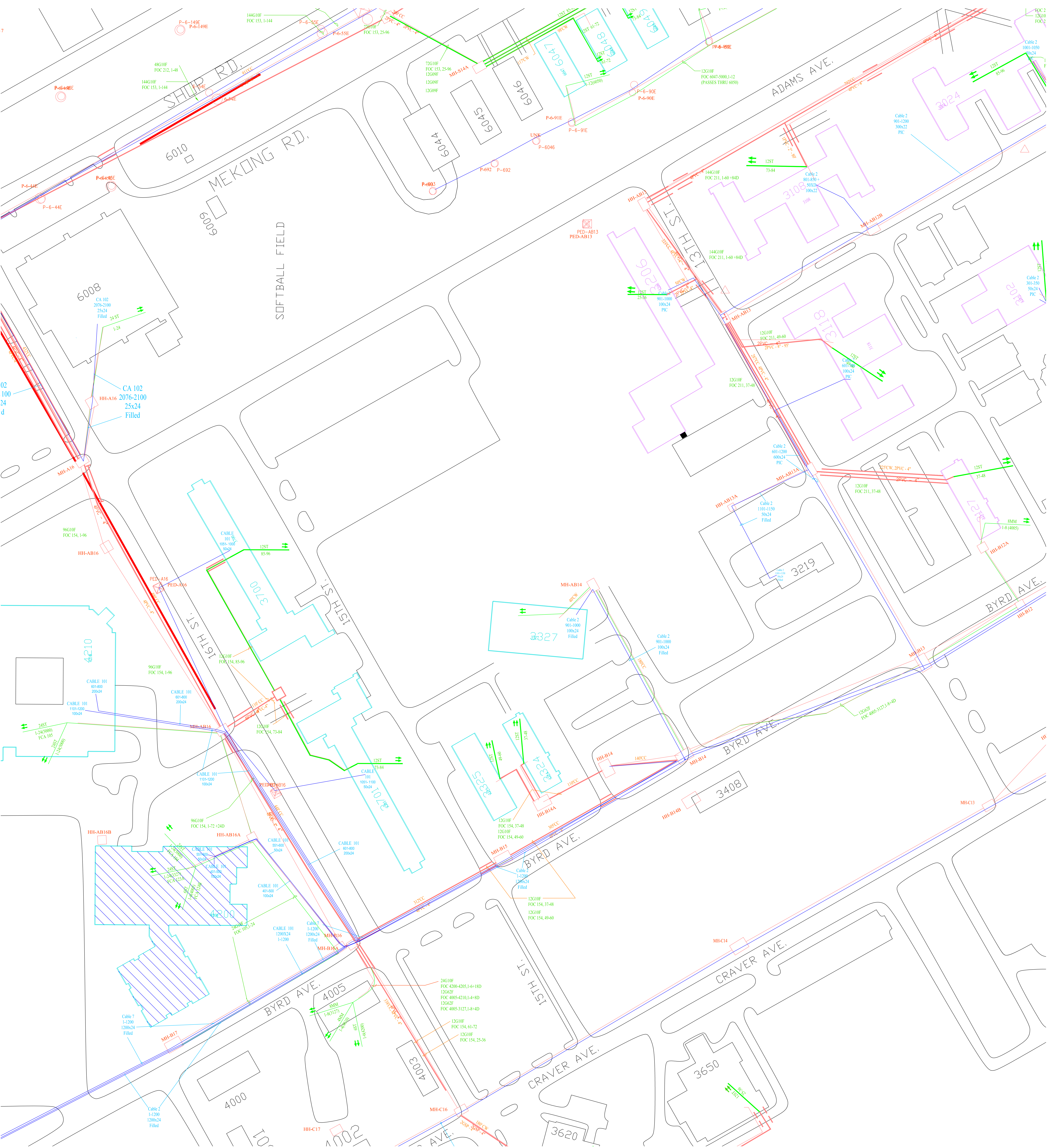
- Crawl spaces
- Uncovered exterior loading platforms or facilities
- Exterior insulation applied to existing buildings
- Open courtyards
- Open paved terraces
- Uncovered ramps
- Uncovered stoops
- Utility tunnels and raceways
- Roof overhangs and soffits measuring less than 3'-0" from the exterior face of the building to the fascia

**(4) Net Floor Area:** Where required, "net area" is calculated by measuring the inside clear dimensions from the finish surfaces of walls. If required, overall "assignable net area" is determined by subtracting the following spaces from the "gross area":

- Basements not suited as office, special mechanical, or storage space
- Elevator shafts and machinery space
- Exterior walls
- Interior partitions
- Mechanical equipment and water supply equipment space
- Permanent corridors and hallways
- Stairs and stair towers
- Janitor closets
- Electrical equipment space
- Electronic/communications equipment space

RMS SUBMITTAL REGISTER INPUT FORM			CONTRACT NUMBER		DELIVERY ORDER																				
TITLE AND LOCATION																									
Button	<-----Right click for Instructions		TYPE OF SUBMITTAL								CLASSIFICATION				REVIEWING OFFICE										
SECTION	PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	01 - PRECON SUBMITTALS	02 - SHOP DRAWINGS	03 - PRODUCT DATA	04 - SAMPLES	05 - DESIGN DATA	06 - TEST REPORTS	07 - CERTIFICATES	08 - MFRS INSTRUCTIONS	09 - MFRS FIELD REPORT	10 - O&M DATA	11 - CLOSEOUT SUBMITTALS	FID - FOR INFORMATION ONLY	GA - GOVERNMENT APPROVED	DA - DESIGNER OF RECORD APPROVAL	CR - CONFORMANCE REVIEW	DA / CR	DA / GA	DO - DISTRICT OFFICE	AO - AREA OFFICE	RO - RESIDENT OFFICE	PO - PROJECT OFFICE	DR - DESIGNER OF RECORD	AE - ARCHITECT / ENGINEER
00 72 00	52.236-13	Accident Prevention Plan	X													X				X					
00 73 00	1.11	Dev. From Accept. Design. No Deviation from Contract					X										X			X				X	
00 73 00	1.11	Dev. From Accepted Design - Deviates from Contract					X											X		X				X	
00 73 00	1.17	Supplemental Price Breakdown	X										X							X					
00 73 00	1.18	SSHO Qualifications	X												X					X					
01 10 00	5.2.3.1	(if concrete pavement) Joint Layout Plan with design drawings					X									X									
01 10 00	5.5.2	Building Envelope Sealing Performance Testing						X					X							X					
01 10 10	***	Tests as Req by Codes - DOR Develops Test Program						X						X						X			X		
01 10 00	5.8.3	BAS Review Information		X													X			X	X			X	
01 10 00	5.8.3	BAS Performance Verification Test						X					X							X				X	
01 10 00	5.8.4	Testing Adjusting and Balancing						X					X							X				X	
01 10 00	5.8.5	Commissioning						X					X							X				X	
01 10 00	6.15	Environmental As Required for Site Specific					X									X				X				X	
01 10 00	6.16	Permits as required for Site specific					X									X				X				X	
01 10 00	5.10.2	Fire Protection Tests						X	X				X							X				X	
01 32 01.00 10	3.4.1	Preliminary Project Schedule	X											X						X					
01 32 01.00 10	3.4.2	Initial Project Schedule	X											X						X					
01 32 01.00 10	3.4.3	Design Package Schedule	X											X						X					
01 32 01.00 10	3.6.1	Periodic schedule updates from the Contractor	X											X						X					
01 32 01.00 10	3.7	Time Extension Request (Schedule)	X											X						X					
01 33 00	1.8	Submittal Register - DOR Input Required	X											X						X				X	
01 33 00	1.8	Submittal Register Updates (Design Packages, etc.)	X											X						X				X	
01 33 00	1.3.1	Substitution of Manuf or Model Named in Proposal		X	X												X			X				X	
01 33 16	1.2	Identify Designer(s) of Record	X											X						X					
01 33 16	1.1.2 / 3.2.4	Fast Track Design Package(s)					X									X			X	X					
01 33 16	1.2	Identification of all Designers of Record	X													X				X					
01 33 16	3.2.1	Site and Utility Des Package, incl. Substantiation					X									X				X	X				
01 33 16	3.2.2/3.5	Interim Des Subm Package(s), incl. Substantiation					X									X				X	X				
01 33 16	3.5.1	Drawings					X									X				X	X				
01 33 16	3.5.2.2	Sitework Design Analyses					X									X				X	X				
01 33 16	3.5.2.3	Structural Design Analyses					X									X				X	X				
01 33 16	3.5.2.4	Security Design Analyses					X									X				X	X				
01 33 16	3.5.2.5	Architectural Design Analyses					X									X				X	X				
01 33 16	3.5.2.6	Mechanical Design Analyses					X									X				X	X				
01 33 16	3.5.2.7	Life Safety Design Analyses					X									X				X	X				
01 33 16	3.5.2.8	Plumbing Design Analyses					X									X				X	X				
01 33 16	3.5.2.9	Elevator Design Analyses (as Applicable)					X									X				X	X				
01 33 16	3.5.2.10	Electrical Design Analyses					X									X				X	X				
01 33 16	3.5.2.11	Telecommunications Design Analyses					X									X				X	X				
01 33 16	3.5.2.12	Cathodic Protection Design Analyses					X									X				X	X				
01 33 16	3.5.3	Geotechnical Investigations and Reports					X									X				X	X				
01 33 16	3.5.4	LEED Submittals					X									X				X	X				
01 33 16	3.5.5	Energy Conservation Documentation					X									X				X	X				
01 33 16	3.5.6	Specifications					X									X				X	X				
01 33 16	3.5.7	Building Rendering					X									X				X	X				
01 33 16	3.2.4/3.7	Final Des Submittal Package(s), incl. Substantiation					X									X				X	X				
01 33 16	3.7.5	DD Form 1354 (Transfer of Real Property)										X				X				X					
01 33 16	3.2.5/3.8	Design Complete Submittal Package(s)					X									X				X	X				
01 33 16	3.3.3	Design and Code Review Checklists					X									X				X	X				
01 33 16	A-2.0	SID - Interim and Final (as applicable)			X	X	X								X					X					
01 33 16	B-2.0	FFE (as Applicable)					X								X					X					
01 45 04.00 10	3.2	Design and Construction QC Plan	X													X				X					
01 57 20.00 10	1.2	Environmental Protection Plan	X													X				X					
01 78 02.00 10	1.2.1	Final as-Built Drawings											X		X										
01 78 02.00 10	1.2.7	Provide final as-built CADD and BIM Model files											X		X						X				
01 78 02.00 10	1.2.9	Provide scans of all other docs in Adobe.pdf format											X		X						X				
01 78 02.00 10	1.3.1	Equip-in-Place list of all installed equip and cost											X		X						X				
01 78 02.00 10	1.3.2	Data on equip not addressed in O&M manuals											X		X						X				
01 78 02.00 10	1.3.3	Final as-built specs - electronic files											X		X						X				
01 78 02.00 10	1.4.2.1	Warranty management plan - FAR 52.246-21											X		X						X				
01 78 02.00 10	1.4.2.1	Certificates of Warranty for extended warranty items											X		X						X				
01 78 02.00 10	1.4.2.1	Contractor's POCs for implementing warranty process											X		X						X				
01 78 02.00 10	1.4.2.1	List of each warranted equip, item, feature or system											X		X						X				
01 78 02.00 10	1.5	See also Section 01 10 00 par. 5.8.4 and 5.8.5											X		X						X				
01 78 02.00 10	1.6.1.2	Equipment O&M Manuals - 1 electronic / 2 hard copies											X		X						X				
01 78 02.00 10	1.7	Field Training DVD Videos										X		X							X				
01 78 02.00 10	1.8	Pricing of CF/CI and GF/CI Property											X	X							X				
01 78 02.00 10	1.11	List of Completed Cleanup Items											X				X				X				









**DEPARTMENT OF THE ARMY**  
**ASSISTANT CHIEF OF STAFF FOR INSTALLATION MANAGEMENT**  
**600 ARMY PENTAGON**  
**WASHINGTON DC 20310-0600**

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FEB 06 2006

**MEMORANDUM FOR SEE DISTRIBUTION**

**SUBJECT: Sustainable Management of Waste in Military Construction, Renovation, and Demolition Activities**

**1. References:**

- a. Army Strategy for the Environment, October 2004.
  - b. Memorandum, Office of the Assistant Secretary of the Army (Installation and Environment), Sustainable Design and Development Policy Update – SPiRiT to LEED Transition, 5 January 2006.
2. All military construction, renovation, and demolition projects shall include contract performance requirements for a 50% minimum diversion of construction and demolition (C&D) waste by weight, from landfill disposal. Compliance with this policy will ensure installations attain the goals of Reference 1.a and the SDD SPiRiT / LEED ratings mandated in Reference 1.b. This requirement applies to all unawarded contracts and solicitations issued 30-days after the date of this memorandum. Contract specifications will include submission of a contractor's C&D Waste Management Plan, preferably prior to the start of site clearance.
3. This policy applies to all construction, renovation, and demolition projects carried out under the Military Construction (MILCON) Army, MILCON Army Reserves, MILCON National Guard Bureau, Army Family Housing Construction, Facilities Reduction, and installation Operation and Maintenance programs. Construction, renovation, and demolition projects funded by other than the above programs are not subject to this policy. However, those exempt may use installation C&D waste facilities and services only when compliant with this policy.
4. Project cost estimates and documentation shall include expenses for the removal and disposal of building materials through demolition, recovery, reuse, and recycling techniques that will not otherwise be offset by revenue, savings, or cost avoidance within the contract. These contracts shall continue to be awarded on either a low cost or best value basis. Detailed implementation guidance is provided in the enclosure.

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SUBJECT: Sustainable Management of Waste in Military Construction, Renovation, and Demolition Activities

5. My point-of-contact is William F. Eng, William.Eng@us.army.mil, 703-602-5827.

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Lieutenant General, GS  
Assistant Chief of Staff  
for Installation Management

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## ENCLOSURE

### DEPARTMENT OF THE ARMY OFFICE OF THE ASSISTANT CHIEF OF STAFF FOR INSTALLATION MANAGEMENT

#### REQUIREMENTS FOR SUSTAINABLE MANAGEMENT OF WASTE IN MILITARY CONSTRUCTION, RENOVATION, AND DEMOLITION ACTIVITIES

13 January 2006

#### 1. References.

a. Army Regulation (AR) 420-49, 28 Apr 1997, Utility Services, Chapter 3: Solid Waste Management (*Provides basic Army policy on solid waste management and recycling.*)

b. Army Strategy for the Environment, October 2004 (*Establishes the Army vision for meeting the mission today and in the future by making sustainability the foundation for the strategy. Lays out 6 long-term goals that form the building blocks of Army sustainability.*)

c. Deputy Assistant Secretary of the Army for Installations and Housing memorandum, Sustainable Design and Development Policy Update – SPiRiT to LEED Transition, 5 January 2006 (*Announces transition from SPiRiT rating to LEED system as of FY2008 MILCON program. Sets LEED Silver as the minimum sustainability rating for vertical New Construction (NC) projects. Prior year projects will continue to use SPiRiT and achieve a Gold level.*)

d. Assistant Chief of Staff for Installation Management memorandum, Military Construction, Army (MCA) Projects and One-for-One Demolition, 24 Apr 2003 (*Requires that an equal amount of facilities be disposed of or demolished for each square foot of new construction.*)

e. Assistant Secretary of the Army for Installations and Environment memorandum, Sustainable Design and Development, 18 March 2003 (*Sets SPiRiT Silver as the minimum sustainability rating for FY2006 MILCON projects under design and SPiRiT Gold for all other FY2006 and future year MILCON projects.*)

f. Assistant Chief of Staff for Installation Management memorandum, Sustainable Project Rating Tool (SPiRiT), 4 May 2001 (*Announces the Army-wide implementation of SPiRiT to self-evaluate the sustainability of facility construction and repair projects. Sets SPiRiT Bronze as the initial minimum sustainability rating for the Army.*)

g. Principal Deputy Assistant Secretary of the Army (Installations and Environment), DASA(I&E) memorandum, Deconstruction and Re-Use of Excess Army Buildings, 18



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January 2001 (*Requests ACSIM to issue policy and guidance for installations to work with non-profits and other non-traditional contract entities to plan and carry out building deconstruction activities.*)

h. Assistant Chief of Staff for Installation Management memorandum, Sustainable Design and Development (SDD) Policy, 26 May 2000 (*Forwards Army (DASA(I&H)) policy that SDD be incorporated into installation facilities planning decisions and infrastructure projects.*)

i. Unified Facilities Guide Specification (UFGS), UFGS-01572, Construction and Demolition Waste Management, February 2003 (*Provides detailed requirements for developing and implementing a C&D waste management plan to promote waste and debris diversion through source reduction, salvage, reuse, and recycling.*)

j. UFGS-02220, Demolition, September 2003 (*Provides general requirements for demolition or removal work, and salvage and recycling of materials and components.*)

k. UFGS-01355, Environmental Protection, February 2002 (*Provides general requirements for developing a recycling and solid waste minimization plan and non-hazardous solid waste diversion reports as part of the project's Environmental Protection Plan.*)

l. Unified Facilities Criteria (UFC), UFC 1-900-01, Selection of Methods for the Reduction, Reuse, and Recycling of Demolition Wastes, 1 December 2002 (*Provides guidance for recovery and recycling of demolition waste, and assists in determining the most feasible methods to reduce the amount of construction and demolition (C&D) waste materials disposed in landfills.*)

m. RCRA in Focus, Construction, Demolition, and Renovation, US Environmental Protection Agency, Office of Solid Waste and Emergency Response Publication EPA-530-K-04-005, September 2004 (*Provides a basic understanding of the regulatory requirements for hazardous Construction & Demolition waste; includes information on managing typical hazardous C&D wastes and a hazardous waste requirements checklist for C&D projects; also tips on reducing C&D waste and a fairly extensive list of contacts for the C&D industry.*)

## 2. Purpose and Applicability.

a. The management of construction and demolition (C&D) debris from the removal of millions of square feet of excess Army buildings is a major challenge. Installations are incorporating Sustainable Design and Development (SDD) principles into facility planning decisions to improve energy usage, quality of life, and the environment. Increasing costs of waste disposal, growing acceptability, and greater value of used

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building materials makes the recovery, reuse, and recycling of C&D debris an important and cost effective component of SDD. Sustainable approaches to waste management can simultaneously provide benefits to the community and the environment, while cost effectively supporting construction, renovation, and demolition activities.

b. The requirements described within this document are for the development and implementation of programs to effectively manage waste generated during all construction, renovation, and demolition activities on Army installations. They are intended to minimize the amount of waste that is disposed of through landfilling and promote more efficient use of new construction materials. The objective is to ensure that sustainable practices of C&D waste management are fully integrated into the planning, design, development, and execution of processes for implementing Sustainable Design and Development (SDD) at the installation. The handling and disposal of hazardous waste materials, as defined below, is outside the scope of these requirements.

c. These requirements apply to all construction, renovation, and demolition projects funded by Military Construction (MILCON) Army, MILCON Army Reserves, MILCON National Guard Bureau, Army Family Housing Construction, Facilities Reduction, and installation Operation and Maintenance. Construction, renovation, and demolition projects funded and carried out by other than the above authorities are not currently subject to this policy. However, those exempt, such as Residential Communities Initiative, Army & Air Force Exchange Service, and Defense Commissary Agency, if they wish to utilize an installation's C&D waste facilities and services, may do so only if they comply with the requirements of this policy.

**3. Definitions.** The following terms are used throughout these requirements.

a. *Construction* – Engineering projects that involve construction, renovation, and/or repair activities.

b. *Construction and demolition (C&D) waste (debris)* – materials generated as a result of construction, renovation, demolition and/or removal projects (e.g., metals, wood, asphalt, concrete, brick, masonry, rocks, rubble, soil, paper, cardboard, plastics, glass, carpet, padding, and related equipment and/or fixtures).

c. *Deconstruction* – planned and controlled building disassembly that preserves the integrity of the building materials and components so that they can be reused or recycled. When the type of construction does not lend itself to “disassembly,” the term deconstruction means the breaking apart of building elements into their more basic constituents (steel, crushed concrete, etc.) and processing for potential reuse and or recycling. Also known as “*sustainable infrastructure removal*.”

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- d. *Disposal* – the landfilling or incineration of C&D waste.
- e. *Diversion* – the redirection of waste, ordinarily disposed of in a landfill or burned in an incinerator, to a recycling facility, to a composting yard, or to another destination for reclamation or reuse.
- f. *Demolition (or “wrecking”)* – an engineering project to reduce a building, structure, paved surface or utility infrastructure through manual and/or mechanized means, with or without the assistance of explosive materials to piles of mixed debris or rubble. Demolition is usually accomplished in a relatively short time frame with or without attempts to segregate the debris or rubble into its various components: wood, metal (steel/cooper), concrete/brick, etc. for recycling.
- g. *Hazardous waste* – any waste substance, which is ignitable, corrosive, reactive, or toxic, or if improperly handled, poses a substantial threat to human health and/or the environment. At the federal level, hazardous wastes are principally governed by Subtitle C, Resource Conservation and Recovery Act (RCRA), the Toxic Substances Control Act (TSCA), the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), or the Asbestos National Emissions Standards for Hazardous Air Pollutants (NESHAPs) under the Clean Air Act. RCRA waste examples include lead and other heavy metals, spent solvents, paints, and thinners, while TSCA wastes would include such materials as PCBs and friable asbestos.
- h. *Recycling facility* – an activity that specializes in collecting, handling, processing, distributing, or reclaiming usable materials from a waste stream for reused by others or remanufacturing into new products.

4. Sustainability Principles:

Army infrastructure projects must adhere to Sustainable Design and Development (SDD) principles. Installation waste and recycling program managers should become familiar with SDD principles and Army policies to ensure that C&D waste management requirements are properly considered and addressed during the planning, design, development, and execution of construction, renovation, and demolition projects. SDD integrates best building practices, technologies, energy conservation, and environmental considerations into installation planning and life-cycle management, including the recovery, recycling and reuse of C&D wastes. Information on SDD is available at the following websites:

ACSIM: <http://www.hqda.army.mil/acsimweb/fd/linksSDD.htm>

USACERL: <http://www.cecer.army.mil/sustdesign/>

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#### 5. Installation C&D Waste Management Overview.

a. Over 60% of the Army's non-hazardous solid waste stream for operations in the Continental United States consisted of C&D debris according to 2004 Army records (SWAR data). C&D debris can constitute up to 80% of the Army's non-hazardous solid waste volume at some installations with major construction and facility removal programs. As much as 15% of all materials used in a construction project will become waste and require disposal.

b. Disposing of C&D wastes in Army-owned landfills consumes capacity that is already in limited supply and dwindling fast. Disposing C&D wastes at a non-installation landfill can be costly in terms of transportation and tipping fees. Incinerating C&D wastes degrades local air quality and results in hazardous ash disposal problems.

c. Sustainable management of C&D waste demonstrates Federal leadership in responsible stewardship of natural resources and can help lower an installation's waste disposal costs, preserve limited landfill capacity, and reduce the need for virgin construction materials. This approach also offers opportunities for reducing the cost of removing facilities. Contractors can recover costs associated with salvage and recycling through their own use or sale of materials, which in a competitive environment will enable them to lower their price to the Government. Where the installation can utilize salvaged or recycled materials on-post, the cost of purchasing new products or virgin materials is avoided. Installations operating C&D landfills benefit from the reduced debris burden, extended landfill life, and associated cost savings.

d. Three significant cost factors in a C&D waste management program are labor, transportation and tipping/disposal fees. Installations that have their own on-site landfills often underestimate the true cost of owning and operating these facilities (capital, engineering, permitting, construction, operation, maintenance, future closure and long-term monitoring costs) by either providing disposal services at no cost or by failing to charge reimbursable customers and contractors enough to cover the true operating costs. Reimbursable customers and contractors shall be charged the full life-cycle cost of disposal at an installation landfill. If Installations are unable to easily calculate reasonable landfill life cycle costs, they shall apply the prevailing local commercial tipping fees as an alternative.

As an added incentive to reduce and divert (instead of demolish) C&D wastes from Army landfills through reduction, recovery, reuse, and recycling, installations are encouraged to offer contract options or performance rebates for levels of diversion that are achieved beyond 50% by weight within each contract or project.

e. Significant waste reduction can only occur through a strategic and deliberate approach to the design, planning, and execution construction, renovation, and

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demolition activities. Early planning to incorporate more efficient facility design and construction processes can reduce the total amount of waste generated, handled and ultimately disposed of in landfills. Best Management Practices during construction and demolition will reduce the amount of waste material generated. Table 1 describes typical C&D debris generated during the various phases of a typical construction project. Successful waste management programs must be comprehensive and pro-actively include the full participation of the installation engineering, contracting, and environmental disciplines as well as all contractors, subcontractors, vendors, and suppliers involved in the project. Installation sustainable management of C&D activities will include, but are not limited to, facility design and construction efficiency, salvage (recovery) for reuse and resale, recycling, disposal, and packaging waste minimization.

**Table 1. Types of C&D Debris Generated in Various Phases of a Construction Project**

Project Phase	C & D Debris
Construction	Mixed rubble, wood, roofing, wall board, insulation, carpet, pipe, plastic, paper, bricks, lumber, concrete block, metals
Demolition	Mixed rubble, concrete, steel beams, bricks, wood, lumber, wallboard, insulation, carpet, pipes, wire, equipment, fixtures
Excavation	Earth, sand, stones, wood
Roadwork	Asphalt, concrete, earth
Site Clearance	Trees, brush, earth, top soil, concrete, mixed rubble, sand, steel, paper, plastic, garbage, rubbish

## 6. C&D Waste Management Program Requirements

### a. Contract Requirements.

1) All future military construction, renovation, and demolition activities shall include C&D waste management performance requirements in solicitation documents. Contract bid specifications shall either reference the following Unified Facilities Guide Specifications (UFGS), or language as appropriate to the program's solicitation document format by editing these UFGS provisions to the specific project. Explicit designation as UFGS is not required:

- UFGS-01355, "*Environmental Protection*"
- UFGS-01572, "*Construction and Demolition Waste Management*" and
- UFGS-02220, "*Demolition*"

NOTE: These UFGS's may be downloaded from the Construction Criteria Base web site: <http://www.ccb.org/docs/ufgshome/UFGSToc.htm>

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(a) UFGS-01355 requires contractors to develop and provide a recycling and solid waste minimization plan and non-hazardous solid waste diversion reports as part of the project's Environmental Protection Plan.

(b) UFGS-01572 requires contractors to submit a C&D Waste Management Plan for government approval within 15 days after contract award and prior to initiating any site clearance activities. The purpose of the plan is to minimize the generation of C&D waste and to ensure that the maximum amount of C&D waste (including materials generated during clearing of the site, demolition of existing structures, and new construction activities) is salvaged for future resale, reuse, or recycling into new products. Installations with on-site C&D disposal facilities may make these facilities available to the demolition/removal contractor at the prevailing tipping fee for the area, or the actual all-inclusive, on-post cost per ton, if known.

(c) General demolition specifications are contained in UFGS-02220 and include the preparation of a demolition plan and the filing of notices to appropriate authorities concerning hazardous materials, explosives, safety and traffic control, etc.

2) These UFGS documents provide general contract performance requirements and depend on the installation's planner or designer to specify further project and site specific requirements. These documents, when completed, should clearly define ownership of property between the government and the contractor. Ensure the solid waste minimization and non-hazardous solid waste provisions of the Environmental Protection Plan, the C&D Waste Management Plan, and the Demolition specifications are coordinated to prevent conflicts.

3) The Corps of Engineers, Engineering and Support Center in Huntsville, AL publishes a number of Public Works Technical Bulletins in the PWTB 200-1 and 420-49 series, focusing on construction and demolition debris topics. Internet address to access PWTB's: <http://www.hnd.usace.army.mil/techinfo/CPW/pwtb.htm>. For example: PWTB 200-1-23, Guidance for the Reduction of Demolition Debris through Reuse and Recycling, and PWTB 420-49-30, Alternatives to Demolition for Facility Reduction.

**b. Contract Administration/Oversight**

1) The installation staff offices responsible for solid waste and/or recycling shall review the required C&D waste management plan for installation-managed projects and participate in the review and approval of C&D waste solicitation documents and waste management plans for projects being performed on the installation by others, such as the Corps of Engineers.

2) For each construction, renovation, or demolition project, installations shall document and monitor implementation of the approved plan. Actual diversion shall be

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monitored throughout the construction or demolition project and conformance with the approved Waste Management Plan and contract performance requirements shall be verified and recorded.

3) Installations will ensure that C&D activities and quantities are captured and reported annually in the Solid Waste Annual Reporting System, Web-version (SWARWeb) SWARWeb is accessible via the Army Environmental Reporting Online (AERO) portal at <https://aero.agpea.army.mil>. See Table 2 on page 14 for specific C&D diversion data requirements for SWARWeb. Huntsville Corps of Engineers, as program manager for FRP, will issue through HQs IMA detailed guidance for reporting FRP diversion data via SWARWeb. C&D diversion data for other programs shall be reported in a similar manner.

4) Managers of new construction, major renovation, facilities reduction or other demolition projects will report their C&D activities to the designated installation POC. Organizations that disposed of their C&D wastes off the installation will also comply with this reporting requirement.

**c. Methods for Managing Demolition Wastes**

1) When non-historical elements of the built environment are old, obsolete, and excess to current and forecasted needs, they are removed to either make way for a replacement facility or to restore the open space for some future use. All removal activities are comprised of a combination of traditional demolition and material recovery, reuse, and recycling techniques.

(a) Traditional demolition is most often accomplished by contracting practices using standard specifications. This is a relatively quick, uncomplicated process, but results in major quantities of waste and debris that must be disposed of in either on-site or off-site landfills.

(b) Appreciable waste stream diversion during demolition can be achieved at no additional cost through proper planning and execution. Historical data shows that the majority of debris materials can be diverted from wood-framed, steel framed, concrete framed, concrete masonry, and pre-engineered metal buildings. Most quantities of concrete, masonry, and metals from any building type can be diverted from landfilling, excluding contaminated materials. The majority of structural material from wood framed buildings can also be diverted through salvage for reuse or recycling, again excluding contaminated materials. Further information and guidance to accomplish appropriate waste stream diversion rates are found in a Best Practices Toolbox located on the Engineering Knowledge Online (EKO) website. The website link will be provided at a later date and updated on a regular basis.

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(c) Material recovery, reuse, and recycling techniques are relatively new concepts when compared to demolition. But these techniques are quickly becoming a more desirable way to remove excess buildings, especially when time constraints are not a major consideration. These methods can be performed under a contract with a firm often specializing in this type of work. Material recovery, reuse, and recycling also lends itself to the use of innovative approaches such as the use of an open auction or sealed bidding process that sells the excess buildings. This method of removal is frequently followed by the use of a supplemental demolition contract to remove and dispose of the remaining non--recycled components. These auctions and sales generate interest from private individuals, small business entrepreneurs, and specialty firms looking to harvest quantities of usable building materials for their own use.

(d) Another innovative approach that can be used for diverting high levels of material from the landfill includes active partnering with non-profit organizations that provide low-cost/no-cost deconstruction and salvage services to further their charitable purposes. Besides generating revenue from the value of the materials reclaimed and reused, there are real dollar savings from the equivalent amount of waste that does not have to be hauled away and landfilled.

(e) The use of on-site mobile concrete and masonry crushing operations can not only reduce waste transportation and disposal requirements but also provide a significant cost avoidance of future requirements by not purchasing new aggregate for construction and/or installation training requirements if required in economical quantities and are at appropriate locations.

2) Unified Facilities Criteria (UFC 1-900-01), "*Selection of Methods for the Reduction, Reuse, and Recycling of Demolition Waste*" provides guidance for recovering and recycling building demolition wastes, by assisting in the process to determine the most feasible methods to reduce the amount of C&D waste that finally is disposed of in a landfill. This UFC is available at the following UFC website:  
[http://65.204.17.188/report/doc\\_ufc.html](http://65.204.17.188/report/doc_ufc.html)

Guided by the UFC, installation planning personnel shall develop a decision matrix, specific to each project situation, which explores as many alternatives as required, using conventional demolition methods as the benchmark for comparison purposes. Many factors and constraints are considered in the matrix, such as type of construction, time constraints from a follow-on MCA project, contracting mechanisms, availability or lack of recycling markets, as well as costs.

3) Precautions must be taken if hazardous materials (e.g., asbestos, lead based paint, or polyaromatic hydrocarbons (PAHs from parquet floor glues), PCBs, mercury-containing material, ozone-depleting substances, Underground and Aboveground Storage Tanks, petroleum contaminated soil) are suspected to be present. Prior to



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undertaking any demolition activities, consult experts in the containment, removal and disposal of these kinds of materials. In addition, consider inclusion of the requirements for testing of materials in the new construction contract specifications, to assure that they will not be hazardous for recycling or reuse purposes.

4) An Army-owned on-site landfill may be used by a construction or demolition contractor for disposal of materials generated under a contract, contingent on the lack of alternative disposal sites within a reasonable (say, 50-100 miles) driving distance, and the payment of a fee, which is equivalent to the tipping fee prevailing in the area or the actual full life-cycle cost of disposal on-site, whichever is less. The full cost for using the installation landfill must be included in the comparison for all alternatives in order to determine which is most cost effective. The installation, at its discretion, may offer to charge the contractor lower disposal fees for attaining higher diversion rates, above the 50 percent minimum.

7. Integrated Solid Waste Management Plan:

a. Installations shall update their Integrated Solid Waste Management Plan (ISWMP) to incorporate C&D waste management principles and requirements. Updates should be completed within 180 days for ISWMP's that have not been updated within the past 5 years and within 1 year for all others. ISWMPs will be checked by higher headquarters when making periodic on-site compliance reviews.

b. Guidance on ISWMP preparation is available from the U.S. Army Center for Health Promotion and Preventative Medicine and the U.S. Army Engineering and Support Center, Huntsville. USACHPPM guide, TG-197, for preparing ISWMPs is at: <http://chppm-www.apgea.army.mil/documents/TG/TECHGUID/TG197.pdf>. The Corps of Engineers TECHINFO website maintained by the U.S. Army Engineering & Support Center, Huntsville, Alabama is also a source of solid waste and recycling technical guidance. In addition to published Public Works Technical Bulletins, the TECHINFO site has an electronic template for tailoring an ISWMP for a specific installation: <http://www.hnd.usace.army.mil/techinfo/CPW/pwtb.htm>.

8. Other Considerations

a. MCA project cost estimates should include the cost and schedule impacts on the DD 1391 for removal of buildings, structures and underground utilities within the "footprint" of the new facility and for non-footprint 1 for 1 structures, whether by traditional demolition methods or through material recovery, reuse, and recycle of building materials. Consideration must be given to any impacts on initial cost or schedule that would not ordinarily occur with traditional demolition scenario, but would result in an overall net savings or benefit to the Government, even if outside the MCA contract. Addressing these issues early in the project development cycle should enable

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the installation and supporting USACE District to accommodate cost and schedule impacts without adverse effect on the project's execution. Any initial cost to be supported by the construction contract price must be included in the DD 1391.

b. As part of the garrison's oversight responsibilities for all facilities projects on the installation, including those funded by private parties, such as RCI, and separately-funded tenant organizations, the installation planning, engineering, solid waste/recycling and environmental staffs must ensure that C&D waste management issues are addressed. For example, installations should work to have the RCI Community Development Master Plan include requirements equivalent to those in this policy, whenever possible.

c. DoD 4160.21-M, Defense Material Disposition Manual. Screening for reutilization of excess or surplus property should be completed prior to reclamation or disposal through C&D activities.

d. Prior to waste disposal on an installation owned and operated landfill, C&D debris should be reduced in volume where economically possible in order to help preserve landfill capacity. Contracting for the service or partnering with another installation may be more economical than purchasing and operating the equipment outright.

e. Schedule Considerations

1) Diversion activities can usually be performed with no adverse schedule impact if they are addressed during project development, i.e. during the planning, design, and contract document development. In this way, the Government is able to incorporate C&D waste diversion activities into the overall project completion objectives with minimal impact on scheduling and unexpected costs. Bidders and offerors can then incorporate salvage and recycling activities when developing their demolition and construction schedules.

2) In isolated cases, the project delivery schedule or construction schedule may constrain or even rule out salvage, recycling, and diversion activities on the demolition or construction site. Externally imposed project completion requirements such as a late addition to the MILCON program, or a previously established Beneficial Occupancy Date for a new Unit of Action may be such examples. Timely completion of the mission-critical project shall take precedence over meeting the minimum diversion criteria of this policy where missing the Beneficial Occupancy Date is directly attributable to debris diversion activities. In these cases, it is incumbent on the contracting agency to attain the highest diversion rate the project schedule will allow.

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3) Wood frame buildings have been removed from the footprint volumetrically and in panels or sections, and have even been “felled” (controlled collapse) to reduce the time necessary to clear the site. On-site materials segregation, off-site materials segregation, scrap utilization and waste reduction programs, packing and packaging reduction, and disposing of debris at C&D recycling facilities are options that can achieve diversion requirements without prolonging demolition activities. Apply the C&D Waste Management Plan to ensure that contractor has evaluated all diversion options when developing the Plan, and is making a good-faith effort to achieve the highest diversion rate practical within the project schedule.

f. Budget Considerations

1) Army experience shows that significant debris diversion can be accomplished within the established budgets. However, low cost cannot be guaranteed in all cases. Cost variables include the types and scope of facilities being removed, hauling costs and tipping fees, labor rates, salvaged materials' condition and markets, and other local factors.

2) There may be cases where the effort and cost to salvage materials for reuse or recycling may exceed the savings associated with diversion. Preserving the ability to award a contract without compromising project scope shall take precedence over meeting this Policy Memorandum's diversion criteria where the cost of achieving the minimum diversion rate is significantly greater than the cost of conventional demolition and landfiling, and the risk of exceeding the available contract amount can be attributed to the difference in cost between conventional demolition, and achieving the minimum diversion rate. Note that the cost of diversion includes the initial cost, offset by salvaged and recycled materials' value, cost savings from reduced hauling and tipping fees, cost avoidance by using recycled materials in lieu of purchasing new materials, and life cycle landfill savings if the installation has an on-post C&D landfill. In these cases, it is incumbent on the contracting agency to ensure the highest diversion rate the project budget will allow. Apply the C&D Waste Management Plan to ensure that the contractor has evaluated all diversion options when developing the Plan, and is making a good-faith effort to achieve the highest diversion rate practical within the project budget.

g. The means and the methods to combine techniques of traditional demolition and disposal versus material reduction, reuse, and recycling rests solely with the garrison. Decision-makers should, however, carefully consider all the pertinent factors that would affect successful project completion and attainment of Army waste policy diversion goals.

h. Networking with the other Services, local communities, and non-profit / charitable groups may help identify resources that may wish to purchase or otherwise obtain installation C&D wastes. Local and/or regional advertising may help determine the

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marketability of excess materials. Any contracts or agreements governing the sale/transfer of these materials must be legally reviewed. Depending on the approach chosen, such parties may be able to purchase buildings through auction or bid, contract for deconstruction services, or subcontract with a conventional demolition contractor to salvage materials. State and county departments of natural resources (or similar agencies) should be consulted to identify any directories, exchanges or referral services for recycling and salvage firms they may maintain. UFC 1-900-1 provides a compendium of resources for building materials salvage, recycling, reuse, and deconstruction.

i. There are many organizations throughout the United States that may provide resources needed for cost effective deconstruction, salvage, recycling, and reuse or resale of building materials. The following are examples of the types of resources available to Army personnel. This list is not intended to be comprehensive. Other organizations and resources are available as well.

1) The US Department of Agriculture Forest Products Laboratory, in partnership with the University of Florida Center for Construction and the Environment, has published a Directory of Wood Framed Building Deconstruction and Reused Building Materials Companies ([http://www.fpl.fs.fed.us/documnts/fplqtr/fpl\\_qtr150.pdf](http://www.fpl.fs.fed.us/documnts/fplqtr/fpl_qtr150.pdf))

2) USEPA maintains a recycling commodities exchange through their Jobs Through Recycling programs. (<http://www.epa.gov/epaoswer/non-hw/recycle/jtr/comm/exchstat.htm> and <http://www.epa.gov/jtr/jtrnet/brokers.htm>)

3) State and local Environmental Protection Agencies, or Departments of Natural Resources, Solid Waste Management or Pollution Prevention divisions or directorates frequently maintain recycled materials directories, materials exchanges, advisory services, and other forms of supports that installations can consult to support C&D materials' diversion. Some selected examples of these services include:

- California Integrated Waste Management Board, California Materials Exchange Network (<http://www.ciwmb.ca.gov/CalMAX/>)
- State of Georgia Pollution Prevention Assistance Division (<http://www.p2ad.org/>)
- King County WA Construction Recycling Directory (<http://www.metrokc.gov/dnrp/swd/construction-recycling/documents/cdlguide.pdf>)
- State of North Carolina Recycle Products Directory (<http://www.p2pays.org/DMRM/start.aspx>)

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- Recycle Texas Online  
(<http://www.tnrcc.state.tx.us/exec/sbea/rtol/index.html>)
- Many Habitat for Humanity Affiliates operate used building materials stores (typically called ReStores) and deconstruction services.  
(<http://www.habitat.org/>). See <http://www.habitat.org/env/restores.aspx> for the ReStore directory.
- Non-profit organizations can be useful in identifying services and outlets for salvaged and recycled materials. These include, but are not limited to:
- Pollution Prevention Resource Exchange  
(<http://www.p2rx.org/aboutUs/aboutP2Rx.cfm>)
- WasteCap, located in several states (example:  
<http://www.wastecapwi.org/>)
- Reuse Development Organization REDO  
(<http://www.redo.org/FindReuse.html>)
- GreenGoat (<http://greengoat.org/whatwedo.html>)

**Table 2 - C&D Diversion Data Elements**

CONSTRUCTION / DEMOLITION SWARWeb PICKLIST		
MAJOR CATEGORY	SUB-CATEGORY	DEFINITION
<b>Wood</b>		
	Structural	TBD
	Finished	TBD
	Treated	TBD
	Other (C/D Wood)	TBD
<b>Metal</b>		
	Steel	TBD
	Copper	TBD
	Aluminum	TBD
	Mixed Metal	TBD
	Other (C/D Metal)	TBD
<b>Masonry/Asphalt/Concrete/Stone</b>		
	Asphalt	TBD
	Brick	TBD
	Concrete	TBD

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	Concrete Block Unit	TBD
	Stone	TBD
	Other (C/D Masonry/Asphalt)	TBD
<b>Land Clearing Debris</b>		
	Top Soil	TBD
	Sub Soil	TBD
	Petroleum-Contaminated Soil	TBD
	Non-Hazardous Lead-Contaminated Soil	TBD
	Vegetation/Timber (tree trunks & limbs)	TBD
	Crushed Stone/Base	TBD
	Other (C/D Land Clearing)	TBD
<b>Other</b>		
	Siding	TBD
	Composition Roof	TBD
	Insulation	TBD
	Doors/Windows/Stairs/Cabinets	TBD
	Ceiling Tile	TBD
	Gypsum/Plaster	TBD
	Plastic	TBD
	Glass	TBD
	Paper	TBD
	Other (C/D Other)	TBD
<b>Additional Information</b>		
Project Number		
Building Number(s)		
Reuse (Installation)		
Reuse (Off-Site)		
Recycle (Installation)		
Recycle (Off-Site)		
Bury (Installation)		
Bury (Off-Site)		
Dispose (Installation)		
Dispose (Off-Site)		
Other		

## **A. STORMWATER MANAGEMENT**

### **A.1 BACKGROUND**

The Fort Lee Department of Public Works is developing comprehensive stormwater management policies that include, among other things, the requirements that:

1. Site designs shall minimize the generation of stormwater and maximize pervious areas for stormwater treatment. Structural and nonstructural infiltration BMPs shall be encouraged to provide stormwater quality and quantity control and groundwater recharge.
2. Natural channel characteristics shall be preserved to the maximum extent practicable.
3. The use of low-impact development (LID) site planning and integrated management practices shall be encouraged to control stormwater runoff at the source and more closely approximate predevelopment runoff conditions.

State and Federal design manuals that address proper stormwater management design techniques, including the following:

- Virginia Stormwater Management Handbook, Volumes I and II, prepared by the Virginia Department of Conservation and Recreation dated 1999, as amended.
- VDOT Drainage Manual, prepared by the Hydraulics Section of the Virginia Department of Transportation dated 2002, as amended.
- Virginia Erosion and Sediment Control Handbook, prepared by the Virginia Department of Conservation and Recreation dated 1992, as amended.
- Low Impact Development Design Strategies: An Integrated Design Approach, United States Environmental Protection Agency, Office of Water, EPA 841-B-00-003 dated June 1999, as amended.
- Low Impact Development Hydrologic Analysis, United States Environmental Protection Agency, Office of Water, EPA 841-B-00-002 dated June 1999, as amended.

The manuals referenced here should be used by designers to ensure that standard, acceptable design practices are used to develop their stormwater management designs.

### **A.2 STORMWATER MANAGEMENT CONCEPT PLAN**

The designer will prepare a stormwater management concept plan to be reviewed and approved by the Ft. Lee Department of Public Works. Detailed design is not required in the stormwater management concept plan; however, sufficient analyses must be performed to show the plan is workable. The amount of analyses required will vary depending on the size and complexity of the development.



All stormwater management concept plans shall indicate the general manner in which site drainage, and stormwater quantity and quality control requirements will be addressed. The following information shall be provided as a minimum for all sites:

1. Soils map and soils data. Soil borings may be required when infiltration facilities are proposed and the development plan offers little or no alternative to infiltration.
2. Identification of hydric soils and potential wetland impacts by proposed facilities.
3. Location of the 100-year floodplain.
4. Location of Chesapeake Bay Preservation Areas (CBPAs).
5. Existing and proposed onsite drainage divides and an offsite drainage area map.
6. Method for providing stormwater management (onsite BMP, regional facility, LID approach) or a request for exception (in writing) including descriptions, drawings, calculations, and other information necessary to evaluate the requested waiver of stormwater management requirements.
7. General description of site drainage system (i.e., natural streams, constructed channels, storm sewer systems, etc.).
8. Location and type of stormwater management facilities and/or LID integrated management practices to provide required stormwater quantity and quality control. Location of proposed access to facilities. Schedule of facility construction for multi-phase projects.
9. Estimation of post-development impervious cover to verify adequacy of technology based water quality BMPs.
10. Channel adequacy computations.
11. Other Federal and State permits being sought if applicable (e.g., VPDES Permit, COE 404 Permit).

Submission of additional information is encouraged as needed to support the stormwater management proposal.

### **A.3 LOW-IMPACT DEVELOPMENT**

The design will incorporate, to the maximum extent practicable, Low-Impact Development approaches. The designer shall provide sufficient information to verify the feasibility of the LID proposal. Such information shall identify the site planning techniques that will result in a stormwater management design plan that maintains the pre-development hydrologic regime (volume, frequency, and peak runoff rate) to the greatest extent possible. Examples of site planning techniques include:

1. Maintaining natural drainage ways and patterns and directing runoff to depression areas.
2. Preserving as many trees as possible, especially those located on hydrologic soil groups (HSG) A and B.
3. Reducing the percentage of impervious area (e.g., pervious pavers, etc.).
4. Locating IMPs in HSG A and B.
5. Disconnecting impervious areas.



6. Limiting clearing and grading in areas containing permeable soils (HSG A and B).
7. Locating impervious areas to less permeable soils (HSG C and D).
8. Maintaining existing natural topography and terrain.
9. Limiting clearing and grading through "site fingerprinting" techniques.
10. Flattening slopes within cleared and graded areas, where feasible, to facilitate on-lot storage and infiltration.
11. Revegetating cleared and graded areas.
12. Dispersing stormwater flow rather than concentrating it in swales, pipes, or channels

Descriptions of these and other site planning techniques can be found in the LID references listed in section A.1.

Low impact development approaches strive to maintain pre-development stormwater infiltration rates. The designer will determine the target infiltration rates for stormwater management designs by one of the following approaches:

1. Water Recharge Volume – as described in Chapter 2 of the 2000 Maryland Stormwater Design Manual
2. Procedures described in section 4.5 of *Low Impact Development Hydrologic Analysis*, United States Environmental Protection Agency, Office of Water, EPA 841-B-00-002 dated June 1999, as amended.
3. For Bailey Creek – the infiltration goal set forth for the relevant catchment in Versar (2006) *Bailey Creek Watershed Delineation*.
4. For other than Bailey Creek Watershed – contact Ft. Lee Environmental Management Office.

#### **A.4 ADEQUATE OUTFALL**

Concentrated stormwater runoff leaving a development site shall be discharged directly into an adequate natural or man-made receiving channel, pipe or storm sewer system or the developer must provide a drainage system satisfactory to the Ft. Lee Department of Public Works to preclude an adverse impact (e.g. soil erosion; sedimentation; yard flooding; duration of ponding water, inadequate overland relief) on downstream properties and receiving channels as well as a proportional improvement of the predevelopment conditions. If the developer chooses to install a storm drainage system, the system shall be designed in accordance with established, applicable criteria for such systems.

##### **A.4.a Analysis of Downstream Drainage Systems**

The downstream drainage system shall be analyzed to demonstrate the adequacy of the system (see A.4.b), or it shall be shown that there is no adverse impact to the downstream system as well as a proportional improvement of the predevelopment conditions (see A.4.c).

The extent of the review of the downstream drainage system shall be:

1. To a point that is at least 150 ft (46 m) downstream to a point where the receiving pipe or channel is joined by another that has a drainage area that is at least 90% of the size of the first drainage area at the point of confluence; or
2. To a point at which the total drainage area is at least 100 times greater than the contributing drainage area of the development site; or
3. To a point that is at least 150 ft (45 m) downstream of a point where the drainage area is 360 acres (1.46 km<sup>2</sup>) or greater.

When using procedures 1 and 3, above, for the extent of review, the analysis must be to a point where all the cross-sections are adequate in the farthest downstream reach of 150 feet. A minimum of three cross-sections shall be provided in the 150 foot reach. If the detention method described in 3, above, is used, the three cross-sections in the farthest downstream reach of 150 feet shall be limited to showing a defined channel or a man-made drainage facility and checking for flooding.

Cross-section selection and information shall be determined in accordance with Chapter 5 of the latest edition of the Virginia Erosion and Sediment Control Handbook (Virginia Department of Conservation and Recreation) under the section titled "Determination of Adequate Channel." Cross-sections shall be shown on the plans with equal horizontal and vertical scales.

#### **A.4.b Adequacy of Receiving Streams**

Adequacy of all natural watercourses, channels and pipes shall be verified as follows:

1. The developer shall demonstrate that the total drainage area to the point of analysis within the channel is 100 times greater than the contributing drainage area of the development site; or
2. Natural watercourses shall be analyzed by the use of a 2-year frequency storm to verify that stormwater will not overtop channel banks nor cause erosion of channel bed or banks;
3. All previously constructed man-made channels shall be analyzed by the use of a 10-year frequency storm to verify that stormwater will not overtop channel banks and by the use of a 2-year frequency storm to demonstrate that stormwater will not cause erosion of channel bed or banks;
4. Pipes, storm sewer systems and culverts shall be analyzed by the use of a 10-year frequency storm to verify that stormwater will be contained within the pipe, system, or culvert.

Determinations of the adequacy of drainage systems shall be performed in accordance with methods contained in Chapter 5 of the latest edition of the Virginia Erosion and Sediment Control Handbook (Virginia Department of Conservation and Recreation) under the section titled "Determination of Adequate Channel."

#### **A.4.c Proportional Improvements**



The required proportional improvement of the downstream system at each inadequate cross-section is the ratio of the post-development C times A for the contributing drainage area of the site to the existing development C times A for the entire drainage area at that cross-section. The required proportional improvement is computed as follows:

$$P_i = [C_d A_d / C_{cs} A_{cs}] \times 100 \text{ where,}$$

$P_i$  = Required Proportional Improvement (%)

$C_d$  = Runoff Coefficient for the Contributing Drainage Area of the Site in a Post-development Condition

$A_d$  = Contributing Drainage Area of the Site

$C_{cs}$  = Runoff Coefficient for the Contributing Drainage Area to the Cross-section in a Existing Development Condition

$A_{cs}$  = Contributing Drainage Area to the Cross-section

A proportional improvement and no adverse impact to the downstream drainage system shall be shown by one of the following methods:

### **Critical Shear Stress Method**

If the outfall is inadequate due to *erosive velocities* along the extent of review the critical shear stress method may be used to show no adverse impact due to erosive velocities. The erosive work on the channel for the post-development conditions shall be reduced to a level below the erosive work on the channel under pre-development conditions by the required proportional improvement.

Each inadequate cross-section along the extent of review shall then be analyzed for the following:

The shear stress for both the predevelopment condition and the post-development condition for the 2-year storm shall be plotted in relation to time at each cross-section. On each graph, the permissible shear stress also shall be plotted. The permissible shear stress is based on the soil type, and may be determined for cohesive soils from Plate 1 and for non-cohesive soils from Plate 2. The soil type may be determined by field test or the soil type designated on the County soils maps may be used. If the soil type is designated using the County soils maps, the most conservative permissible shear stress for the soil type shall be used. The plans shall indicate how the soil type was determined. The area between the permissible shear stress and the actual shear stress on the graph is erosive work on the channel. The erosive work for the post-development condition shall be less than the erosive work for predevelopment condition by a percentage equal to the required proportional improvement.

The shear stress on the channel can be calculated using the following formula:

$t = gRS$  where,

$t$  = shear stress in lb/sq.ft. ( $N/m^2$ )

$g$  = unit weight of water is 62.4 lb/ft<sup>3</sup> (9810 N/m<sup>3</sup>)

$R$  = hydraulic radius in ft (m)

$S$  = slope of the channel bed

### Channel Capacity Method

If the outfall is inadequate due to *inadequate capacity* along the extent of review, the channel capacity method may be used to show no adverse impact due to overtopping. The largest storm that does not exceed the actual channel, pipe, or culvert capacity under pre-development conditions shall be determined for the cross-section that is most frequently over its capacity. The post-development peak flows for the above storm and the 2-year and 10-year storms shall be reduced to a level below the pre-development conditions by a percent equal to the required proportional improvement.

### Detention Method

It shall be presumed that no adverse impact and a proportional improvement will occur if on-site detention is provided as follows and the outfall is discharging into a defined channel or man-made drainage facility:

1. Extended detention of the 1-year storm volume for a minimum of 24 hours. If extended detention of the BMP volume (see § 6-0400 et seq.) also is provided, the 24 hours shall be applied to the difference between the 1-year storm volume and the BMP volume; and
2. In order to compensate for the increase in runoff volume, the 2-year and 10-year post-development peak rates of runoff from the development site shall be reduced below the respective peak rates of runoff for the site in good forested condition (e.g., for NRCS method, a cover type of "woods" and a hydrologic condition of "good"). This reduction results in a proportional improvement and is computed as follows:

$$R_i = [1 - (V_f / V_d)] \times 100 \text{ where,}$$

$R_i$  = Reduction of Peak Flow Below a Good Forested Condition (%)

$V_f$  = Runoff Volume from the Site in a Good Forested Condition

$V_d$  = Runoff Volume from the Site in a Post-Developed Condition

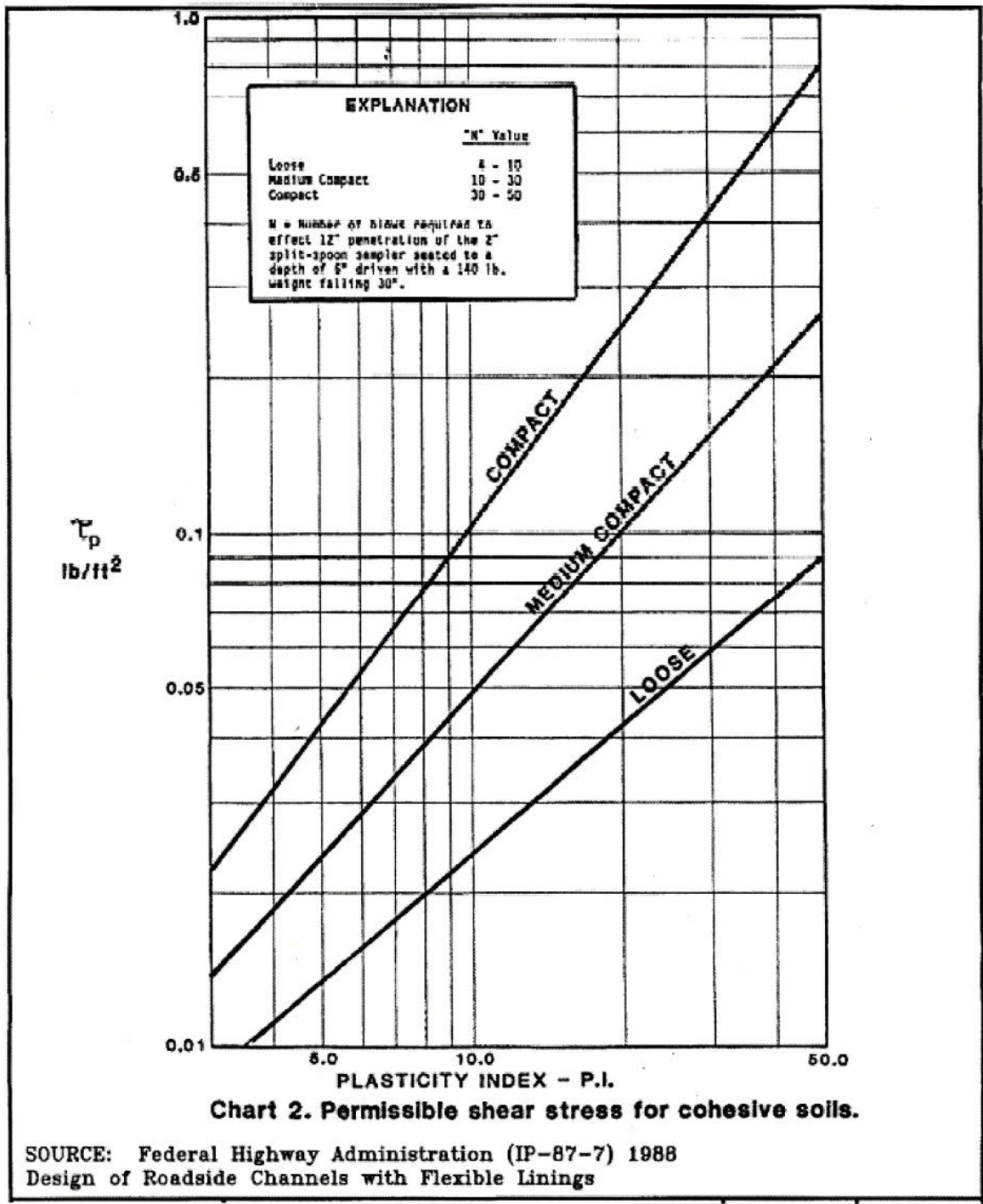
The calculation of the cumulative volumes shall be based on the NRCS (formerly SCS) methodology described in § 6-0802 or other methods as approved by the Director.

Computations demonstrating the 1½-year post-development peak rate of runoff from the development site does not exceed the 1½-year peak rate of runoff for the site in good forested condition are optional. The 1½-year storm is used to obtain Leadership in Energy and Environmental Design (LEED) certification.

If this method is used, each outfall from the site shall be analyzed independently and the allowable release rate shall be based on the area of the site that drains to the outfall under predevelopment conditions.

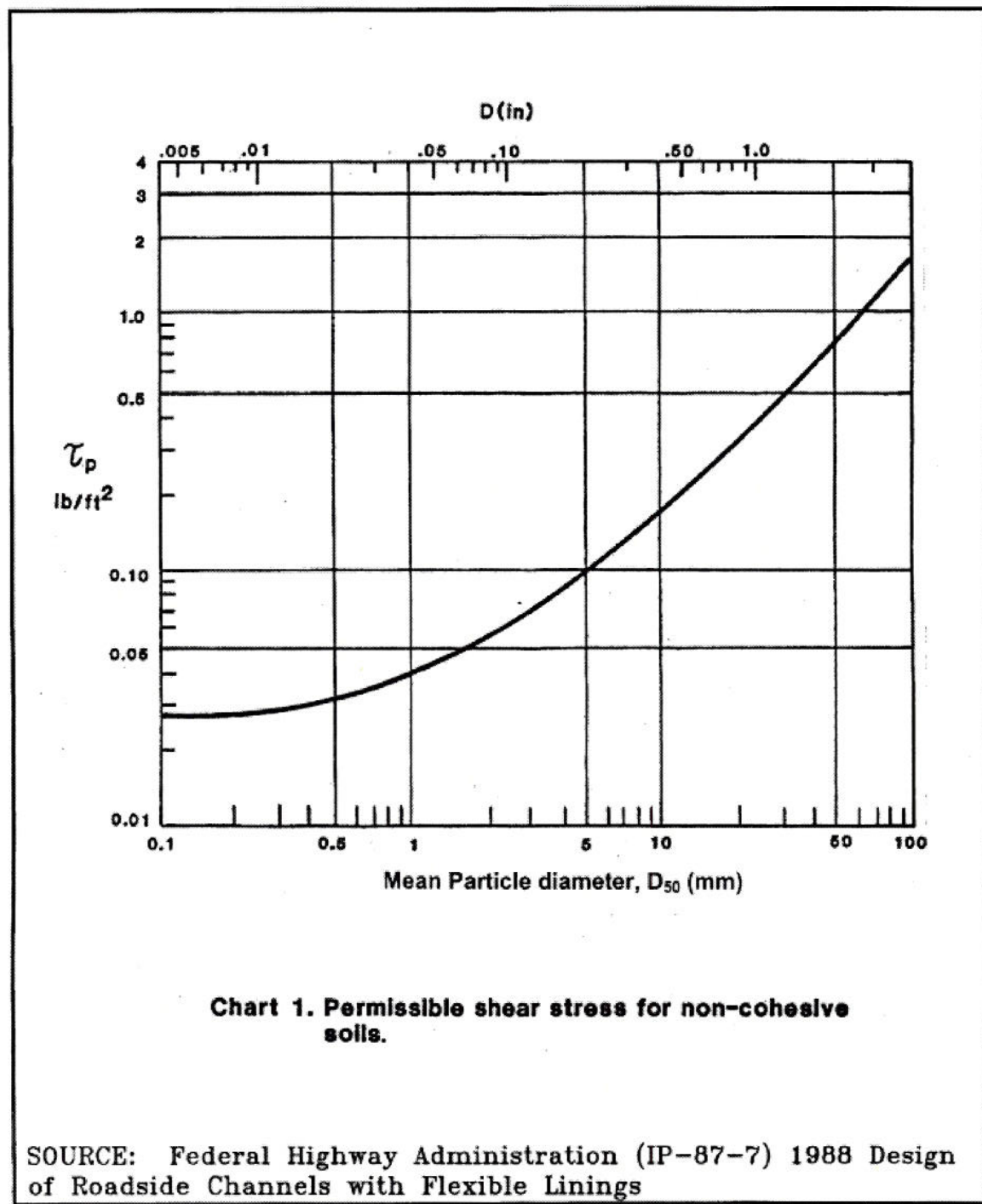
Other scientifically valid methods, which show no adverse impact regarding erosion or capacity for an inadequate outfall and show proportional improvement, may be approved by the Ft. Lee Department of Public Works.

PLATE 1





## PLATE 2



## Site Specific Storm Water Pollution Prevention Plan

### SITE-SPECIFIC STORMWATER PACKAGE

This package contains the following:

- Site-Specific Stormwater Pollution Plan Requirements
- Construction Contractor Certification
- Information Checklist for SP3
- Blank Site-Specific SP3 for use as an example or template
- Construction Site Stormwater Inspection Form
- Copy of Permit available hard copy only from EMO

Provide to Fort Lee Environmental Management Office (EMO) prior to Construction

The plan must be approved by EMO:

- Site-specific Stormwater Pollution Prevention Plan
- Signed Construction Contractor Certification

Inspection forms must be maintained by contractor or project manager and copy provided to EMO Personnel.

EMO point of contact is Craig Norris at 734-3772, [craig.norris@us.army.mil](mailto:craig.norris@us.army.mil)

## Site Specific Storm Water Pollution Prevention Plan

### SITE-SPECIFIC STORMWATER POLLUTION PREVENTION PLAN REQUIREMENTS

Each construction activity at Fort Lee is required to have a site-specific Stormwater Pollution Plan (SP3). The SP3 will be generated by the construction contractor and submitted to the site's Construction/Project Manager and the EMO for review and approval. The initial site specific SP3 and all modifications including a signature page with the name of the person responsible for preparing the site-specific SP3 will be kept on file in EMO. The site-specific SP3 shall include the following information:

- Site Description
- Site Map
- Types of Controls
- Non-Stormwater Management
- Post-Construction Stormwater Management
- Waste Management and Disposal
- Maintenance, Inspection, and Repair Procedures
- Identification of Contractors, Subcontractors, and their tasks
- Monitoring and Reporting
- Certification

The key elements of the site-specific SP3 are the site description and the site map (Construction plan). The site map will include details of areas ¼ mile beyond the construction site boundaries and will provide the following information:

- Lateral limits of the construction site
- Surface water bodies, including known springs and wetlands
- Areas of soils to be disturbed
- Locations of controls to be used during construction
- Locations of stormwater management controls to be used post-construction
- Outline of off-site drainage areas that discharge into the construction site
- General topography
- Anticipated discharge location(s) where the construction site's stormwater discharges to the installation's stormwater drainage system or other water body.

Descriptions of on-site sources shall be provided with the site-specific maps and shall outline proposed and proper on-site practices. Examples of these descriptions shall include the following:

- List of toxic materials that are known to have been treated, stored, disposed, spilled, or leaked in significant quantities (estimated volumes also to be listed) onto the construction site.
- Stormwater control practices for construction materials, equipment, and vehicles.
- Construction material loading, unloading, and access areas
- Equipment storage, cleaning, and maintenance areas.



## Site Specific Storm Water Pollution Prevention Plan

A site-specific SP3 should not be limited to the above information. The requirements outlined above are the minimum requirements to satisfy Fort Lee's VPDES permit for stormwater discharges associated with construction activity; however, additional information not outlined above, but relevant to site-specific stormwater issues should be included with the site-specific SP3 for that construction site. References include EPA's Stormwater Management for Construction Activities – Developing Pollution Prevention Plans and Best Management Practices (EPA 833-R-92-001, October 1992), Virginia's VR 680-14-19 VPDES General Permit Regulation for Stormwater Discharges from Construction Sites, Virginia Stormwater Management Regulations 4 VAC 3-20, and the Virginia Stormwater Management Handbook, First Ed. 1999.

The Engineer responsible for reviewing the site-specific SP3 shall use the checklist provided to ensure that the necessary information is compiled for the plan. If additional information is required, the Engineer can request additional information from the Contractor or use the following supplemental sources:

- United States Geological Survey: For general topographic information and for locations of waterways receiving runoff from each project site.
- Natural Resources Conservation Service: For general soil information, including surface soil erosion potential.
- National Wetlands Inventory Maps: For general locations of documented sensitive wetland areas.
- Federal Emergency Management Agency: For floodplain map data indicating the extent of building restriction lines without flood protection.
- Previous in-house construction project data (if available): For geotechnical boring logs, slope stability studies for site grading, retaining walls, stream channel protection, storm or surface water sampling data, and aerial photography indicating locations of grasslands, woodlands, and unstable slopes.
- Virginia Sediment and Erosion Control Handbook

**Site Specific Storm Water Pollution Prevention Plan****FORT LEE, VA  
CONSTRUCTION CONTRACTOR CERTIFICATION**

I certify, under penalty of law, that I have read and understand the terms and conditions of the general Virginia Pollutant Discharge elimination System (VPDES) permit that authorizes the stormwater discharges associated with the construction activity from the Fort Lee construction site and the Stormwater Pollution Prevention Plan (SP3) associated and identified as part of this certification.

Duty or Responsibility: \_\_\_\_\_

Contractor:

Name: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

Phone: \_\_\_\_\_

Authorized Signature

Print Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

**Site Specific Storm Water Pollution Prevention Plan****INFORMATION CHECKLIST FOR CONSTRUCTION SP3S****Site Description**

- ☐ Description of project purpose
- ☐ Schedule of major soil disturbing activities
- ☐ Soil disturbances necessary to complete the project
  - ☐ Soil Excavation                      Grading                      Clearing
  - ☐ Soil Stockpiling                      Demolition                      Preparation for planting
  - ☐ Other(s) \_\_\_\_\_
- ☐ Estimate the size of the project site and the area to be disturbed
- ☐ Calculate the runoff coefficient for the site (before and after construction)
- ☐ Description of existing vegetation at the site
- ☐ Description of other potential pollution sources, including vehicle fueling, chemical storage, sanitary facilities, etc.
- ☐ Name of surface water body receiving runoff from the project site
- ☐ Pollution prevention site map
  - ☐ Drainage patterns and slopes/contours after grading
  - ☐ Areas of soil disturbance
  - ☐ Location of major structural and nonstructural controls identified under "Controls"
  - ☐ Location of areas requiring stabilization practices, including types of cover
  - ☐ Surface waters, including wetlands
  - ☐ Location of surface runoff discharge points and drainage areas
  - ☐ Existing and planned paved areas and buildings
  - ☐ Locations of permanent stormwater management practices
- ☐ Locations of other potential pollution sources

**Controls**

## Description of applicable controls

- ☐ Erosion and Sediment Controls
  - ☐ Stabilization Practices
  - ☐ Structural Practices
- ☐ Stormwater Management
- ☐ Other Controls

**Maintenance**

- ☐ Description and schedule of maintenance procedures

## Site Specific Storm Water Pollution Prevention Plan

### Inspections

- ☐ At least once every 14 calendar days and within 48 hours of the end of a storm event that is 0.5 inches or greater. Where areas have been finally or temporarily stabilized or runoff is unlikely due to winter conditions (e.g., site is covered with snow, ice, or frozen ground exists) such inspections shall be conducted at least once every month.
- ☐ Inspection of disturbed areas, erosion and sediment control structures/practices, and exposed material storage areas
- ☐ Updates to SP3 based on inspections, if appropriate (within 7 days)
- ☐ Inspection reporting

### Non Stormwater Discharges

- ☐ Identify all NSDs (except fire fighting flows)

### Certifications

- ☐ Identify each measure and contractor/subcontractor responsible for implementation
- ☐ Certification statement signed by each identified contractor/subcontractor

## Site Specific Storm Water Pollution Prevention Plan

### SITE SPECIFIC STORMWATER POLLUTION PREVENTION PLAN (use as an example or as a template)

#### 1.0 SITE DESCRIPTION

Project Name & Location:

Owner Name & Address:     Commander, Fort Lee  
    Directorate of Public Works  
    Fort Lee, Virginia 23801-5200

Description of Purpose of Project:

Runoff Coefficient  
     Before construction: \_\_\_\_\_     After construction: \_\_\_\_\_ (Rational Method)

Total Area of Construction Site:     Acres  
 Estimated Area of Soils to be Disturbed:     Acres

Name(s) of Receiving Water(s):

#### 2.0 SITE MAP

The following items are included on the site map (Appendix A). The list is presented in checklist form, with the plate number on which each item can be found.

	Sheet No.
<input type="checkbox"/> Drainage patterns and estimated slopes/contours after grading.	_____
<input type="checkbox"/> Areas of soil disturbance.	_____
<input type="checkbox"/> Locations of major structural and nonstructural controls.	_____
<input type="checkbox"/> Locations of areas requiring stabilization practices, including types of cover.	_____
<input type="checkbox"/> Surface waters, including wetlands.	_____
<input type="checkbox"/> Locations of surface runoff discharge points and associated drainage areas.	_____
<input type="checkbox"/> Existing and planned paved areas and buildings.	_____

## Site Specific Storm Water Pollution Prevention Plan

- ☐ Locations of permanent stormwater management practices. \_\_\_\_\_
- ☐ Locations of other potential pollution sources. \_\_\_\_\_

### 3.0 POTENTIAL SOURCES

The following is a list of potential sources of stormwater pollution expected at Fort Lee construction sites. A check is placed next to all sources that apply to this particular construction site and activity. A blank has been provided at the end of the list for any additional potential sources.

#### Construction Activities

- |  |                                      |
|--|--------------------------------------|
| <input type="checkbox"/> Vegetation clearing | <input type="checkbox"/> Excavations |
| <input type="checkbox"/> Soil stockpiling    | <input type="checkbox"/> Grading     |
| <input type="checkbox"/> Other:              |                                      |

#### Other Sources

- |  |  |
|--|--|
| <input type="checkbox"/> Vehicle fueling             | <input type="checkbox"/> Stockpiled gravel or asphalt        |
| <input type="checkbox"/> Hazardous materials storage | <input type="checkbox"/> Building materials (please specify) |
| <input type="checkbox"/> Solid waste storage         | <input type="checkbox"/> Sanitary waste facilities           |
| <input type="checkbox"/> Other:                      |  |

### 4.0 CONTROLS

The following is a checklist of control measures that are expected to be implemented during the course of this project. Other measures, not included on the list, are provided in the blanks provided.

#### Erosion and Sediment Controls

##### Stabilization Practices

- |  |  |
|--|--|
| <input type="checkbox"/> Temporary seeding   | <input type="checkbox"/> Permanent seeding                 |
| <input type="checkbox"/> Mulching            | <input type="checkbox"/> Geotextiles                       |
| <input type="checkbox"/> Sod stabilization   | <input type="checkbox"/> Vegetative buffer strips          |
| <input type="checkbox"/> Protection of trees | <input type="checkbox"/> Preservation of mature vegetation |
| <input type="checkbox"/> Other:              |  |

##### Structural Controls

- |   |   |
|---|---|
| <input type="checkbox"/> Silt fencing                 | <input type="checkbox"/> Earthen dikes          |
| <input type="checkbox"/> Drainage swales              | <input type="checkbox"/> Sediment traps         |
| <input type="checkbox"/> Sediment basin(s)            | <input type="checkbox"/> Check dams             |
| <input type="checkbox"/> Subsurface drains            | <input type="checkbox"/> Pipe slope drains      |
| <input type="checkbox"/> Storm drain inlet protection | <input type="checkbox"/> Rock outlet protection |
| <input type="checkbox"/> Other:                       |   |

## Site Specific Storm Water Pollution Prevention Plan

### Stormwater Management

The following measures will be installed during the construction process to control pollutants in stormwater discharges that may occur after construction is completed.

- ☐ Stormwater detention ponds or other detention structures
- ☐ Stormwater retention ponds or other retention structures
- ☐ Flow attenuation by use of open vegetated swales and natural depressions
- ☐ Infiltration of runoff on site
- ☐ Sequential systems (combination of several practices)
- ☐ Velocity dissipation device at discharge locations to provide a non-erosive flow velocity
- ☐ Other:

### Other Controls

Other types of controls not related to sediment and erosion control will be implemented during the course of the construction activity. All that apply are indicated.

#### Solid Wastes

- ☐ Place in closed dumpsters
- ☐ Place in trashcans with lids
- ☐ Other:

#### Hazardous Wastes

- ☐ Place in closed, EPA/DOT-approved containers
- ☐ Stored in a covered area (tarp, portable shed, lean-to)
- ☐ Placed within a bermed storage area
- ☐ Other:

#### Sanitary Waste

- ☐ Portable facilities that are closed and covered will be used
- ☐ Facilities in area where it is unlikely to be damaged or disturbed by heavy equipment.
- ☐ Other:

#### Raw Material Storage Areas

- ☐ Kept in closed, EPA/DOT-approved containers
- ☐ Stored in a covered material storage area (tarp, portable shed, lean-to)
- ☐ Kept within a bermed storage area
- ☐ Other:

## Site Specific Storm Water Pollution Prevention Plan

### 5.0 TIMING OF ACTIVITIES AND CONTROLS

The following is a written description of soil-disturbing activities and controls, and in what sequence these activities will occur. Locations, area(s) involved, and types of controls for each activity are described in the order they are expected to occur.



## Site Specific Storm Water Pollution Prevention Plan

### 6.0 INSPECTIONS AND MAINTENANCE

- Contractors will follow, at a minimum, the inspection and maintenance procedures outlined in Section 3.5 of Fort Lee's General SWP3 for Construction Activities. These procedures include inspections at least once every 14 calendar days and within 48 hours of the end of a storm event that is 0.5 inches or greater. Where areas have been finally or temporarily stabilized or runoff is unlikely due to winter conditions (e.g., site is covered with snow, ice, or frozen ground exists) such inspections shall be conducted at least once every month. Any deviations from these procedures, including more stringent inspection and maintenance procedures, are provided below:

### 7.0 IDENTIFICATION OF NON-STORMWATER DISCHARGES

All non-stormwater discharges (NSDs) associated with construction activities that are planned or expected to occur during this construction activity are listed below:

- Discharges from fire fighting activities
- Fire hydrant flushing
- Waters used to wash vehicles or control dust
- Air-conditioning condensate
- Uncontaminated groundwater, including foundation or footing drains
- Pavement washwaters, where spills or leaks of toxic or hazardous materials have not occurred and where detergents are not used
- Potable water sources, including: water line flushing; irrigation drainage; lawn watering; and routine external building washdown that does not use detergents

## Site Specific Storm Water Pollution Prevention Plan

### 8.0 MATERIAL INVENTORY

The following materials are expected to be on-site during the construction activities:

#### Construction materials

- |   |                                  |
|---|----------------------------------|
| <input type="checkbox"/> Bags of cement and other dry materials | <input type="checkbox"/> Drywall |
| <input type="checkbox"/> Asphalt                                | <input type="checkbox"/> Metals  |
| <input type="checkbox"/> Tar                                    |                                  |
| <input type="checkbox"/> Other:                                 |                                  |

#### Hazardous materials

- |  |   |
|--|---|
| <input type="checkbox"/> Solvents              | <input type="checkbox"/> Compressed gas cylinders |
| <input type="checkbox"/> Paints                | <input type="checkbox"/> Fertilizers              |
| <input type="checkbox"/> Pesticides/Herbicides | <input type="checkbox"/> Cleaners/detergents      |
| <input type="checkbox"/> Other:                |   |

#### Equipment maintenance materials

- |  |   |
|--|---|
| <input type="checkbox"/> Fuel              | <input type="checkbox"/> Antifreeze         |
| <input type="checkbox"/> Motor oil, grease | <input type="checkbox"/> Transmission fluid |
| <input type="checkbox"/> Hydraulic fluids  |   |
| <input type="checkbox"/> Other:            |   |

#### Other materials not listed above

- ☐ Other:

### 9.0 GOOD HOUSEKEEPING

Contractors will follow, at a minimum, the good housekeeping procedures outlined in Section 3.2.3 of Fort Lee's General SWP3 for Construction Activities. Any expected deviations from these procedures are provided below:

## Site Specific Storm Water Pollution Prevention Plan

### 10.0 SPILL PREVENTION

Contractors will follow, at a minimum, the spill prevention procedures outlined in Section 3.2.3 of Fort Lee's General SWP3 for Construction Activities. Any expected deviations from these procedures are provided below:

Are materials expected to be on-site that can spill or leak (e.g., fuel, oils, paints)?

☐ Yes      ☐ No

Will a spill response kit be maintained on site?

☐ Yes      ☐ No

### 11.0 CONTRACTOR'S CERTIFICATION

All contractors with responsibilities related to preventing stormwater pollution have signed certification forms provided.

Follow-up visit required

☐ YES ☐ NO

## STORMWATER INSPECTION FORM FOR CONSTRUCTION PROJECTS FORT LEE, VA

Follow-up visit required

☐ YES ☐ NO

## STORMWATER INSPECTION FORM FOR CONSTRUCTION PROJECTS FORT LEE, VA

**Inspect site at least once every 14 calendar days and within 48 hours  
of the end of a storm event that is 0.5 inches or greater.**

Contract No./Plot (Area): \_\_\_\_\_ Date: \_\_\_\_\_

Site Description: \_\_\_\_\_

Weather Condition: \_\_\_\_\_

Days Since Last Rainfall: \_\_\_\_\_ Amount of Last Rainfall: \_\_\_\_\_

Project Manager: \_\_\_\_\_

On-site Construction Inspector: \_\_\_\_\_

Contractor: \_\_\_\_\_ Site Telephone #: \_\_\_\_\_

Contractor's Superintendent: \_\_\_\_\_ Contractor's Tel. #: \_\_\_\_\_

24 Hour Emergency Tel. #: \_\_\_\_\_ Stormwater Inspector: \_\_\_\_\_

Are the following practices in satisfactory condition  
and in compliance with the Stormwater Pollution Prevention Plan?

### EROSION & SEDIMENT CONTROL PRACTICES

☐ surface roughening☐ silt fence☐ dust control☐ straw bale barrier☐ stormwater inlet protection☐ safety fencing☐ temporary stone construction entrance☐ ground cover/perm. or temp. seeding☐ geotextile fabric/visqueen☐ outlet protection☐ stockpile covers☐ other \_\_\_\_\_

Issues: \_\_\_\_\_

\_\_\_\_\_

Corrective Actions: \_\_\_\_\_

\_\_\_\_\_

### GROUND MAINTENANCE PRACTICES

☐ disposal of wash water to industrial waste system☐ presence of soil, grit or other sediment in sumps☐ other \_\_\_\_\_☐ wells in operation☐ holding tanks

Issues: \_\_\_\_\_

\_\_\_\_\_

Corrective Actions: \_\_\_\_\_

\_\_\_\_\_

Follow-up visit required

☐ YES ☐ NO**STORMWATER INSPECTION FORM FOR CONSTRUCTION PROJECTS  
FORT LEE, VA****CONSTRUCTION MATERIAL STORAGE PRACTICES**

☐ general housekeeping ☐ paint  
☐ hazardous material – labels, storage practice ☐ solvents  
☐ hazardous wastes – storage practices ☐ roof tar  
☐ spill response equipment ☐ storage shed(s)  
☐ above ground storage tank (refueling)  
☐ construction material (type) \_\_\_\_\_  
☐ other \_\_\_\_\_

Issues: \_\_\_\_\_  
\_\_\_\_\_

Corrective Actions: \_\_\_\_\_  
\_\_\_\_\_

**CONSTRUCTION EQUIPMENT AND VEHICLE MANAGEMENT PRACTICES**

☐ equipment wash pad ☐ spill prevention  
☐ equipment leaks ☐ hazardous material storage tank  
☐ drip pans ☐ refueling area  
☐ equipment parts and hazardous wastes storage  
☐ equipment maintenance area  
☐ other \_\_\_\_\_

Issues: \_\_\_\_\_  
\_\_\_\_\_

Corrective Actions: \_\_\_\_\_  
\_\_\_\_\_

**Inspector:**

Print Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Representing: \_\_\_\_\_

## INFORMATION PAPER

14 July 2008

**SUBJECT:** Changes to General Permit for Discharges of Stormwater from Construction Activities  
VAR100270

**PURPOSE:** To provide guidance on Stormwater Permit coverage for construction at Fort Lee.

**FACTS:**

1) After consultation with the Virginia Department of Recreation and Conservation (DCR) it was determined that the current General Permit is a project specific permit and independent projects cannot be granted coverage under the same permit number. Therefore, the use of Permit VAR100270 to cover the numerous construction projects on Fort Lee is a misapplication of the permit.

2) All projects currently under construction will continue to fall under the requirements of VAR100270 until completion, that is, they must continue to operate under the DOL/DPW-EMO approved Sediment and Erosion Control and Stormwater Pollution Prevention (SWP3) plans. DOL/DPW-EMO will continue regular inspections of these projects, and will serve as stormwater "regulator". See Table 1 for list of included projects.

3) Projects not listed must individually apply for coverage to DCR under the Virginia Stormwater Management Program. This applies to projects disturbing one or more acres, either individually or as part of an overall development. Additionally, all projects disturbing more than 10,000 square feet must comply with the requirements of the Virginia Sediment and Erosion Control Regulation to include the requirements for a Responsible Land Disturber and submission of a Sediment and Erosion Control Plan. IAW Fort Lee's permitted Small Municipal Separate Storm Sewer System (MS4), the contractor must submit any required registration statement and accompanying documentation for their project to the DOL/DPW EMO for review and approval at least 30 days prior to submission to DCR. The permit application must be filed and required fees paid by the "operator" of the construction project, as defined in 4VAC50-60. A copy of the registration form and fee structure is included at Table 2.

4) IAW Fort Lee's MS4 permit, DOL/DPW EMO will still routinely inspect construction sites for compliance with the law, however, the DCR will be the prime enforcement agency for construction stormwater permits, and will have the authority to inspect, issue citations, and level fines and penalties for violations. These changes have been included in a revised Fort Lee Special Environmental Conditions section to be added to all USACE specification packages for Fort Lee. Project Managers should review their specifications to ensure that these changes are incorporated. If you have any questions please contact Mr. Craig Norris, phone (804) 734-3772, email [craig.norris@us.army.mil](mailto:craig.norris@us.army.mil)

Craig Norris/IMNE-LEE-PWE/734-3772

APPROVED BY

15 July 2008

**TABLE 1****Projects to remain under the requirements of Permit VAR100270**

- 1) Sustainment Center of Excellence (SCoE) HQ
- 2) Logistics University/Simulation Center
- 3) Soldier Support Center
- 4) TSED
- 5) North Range
- 6) TA-5 DFAC
- 7) TA-5 AIT Barracks
- 8) TA-5 Central Campus
- 9) TA-5 Infrastructure
- 10) Family Housing Replacement (Hunt)
- 11) DeCA addition

**TABLE 2**



**VSMP General Permit Registration Statement - Construction Activity Stormwater Discharges (DCR01)**

(Please Type or Print All Information)

1. **Construction Activity Operator** (NOTE: The permit will be issued to this operator, and the Certification in Item #13 must be signed by the appropriate person associated with this operator [see the instructions])

Name: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_ Phone: \_\_\_\_\_

2. **Location of Construction Activity**

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

If street address unavailable: Latitude \_\_\_\_\_ Longitude \_\_\_\_\_

**Location of all Offsite Support Activities to be Covered Under the Permit**

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

If street address unavailable: Latitude \_\_\_\_\_ Longitude \_\_\_\_\_

3. **Status:** Federal ☐ State ☐ Public ☐ Private ☐ (Check one only)

4. **The Nature of the Construction Project** (e.g., commercial, industrial, residential, agricultural, oil and gas, etc.):

\_\_\_\_\_

5. **Name of the Receiving Water(s)** \_\_\_\_\_

6. **If the Discharge Is Through a Municipal Separate Storm Sewer System (MS4), the Name of the Municipal Operator of the Storm Sewer:** \_\_\_\_\_

7. **Estimated Project Start Date:** \_\_\_\_\_ **Estimated Project Completion Date:** \_\_\_\_\_

8. **Total Land Area of Development** (to the nearest one-tenth acre): \_\_\_\_\_

**Estimated Area to be Disturbed** (to the nearest one-tenth acre): \_\_\_\_\_

9. **Is the area to be disturbed by the construction activity part of a larger common plan of development or sale?** Yes ☐ No ☐

10. **Map:** Attach a topographic map or other map which clearly shows the location of the construction activity, the area to be disturbed (including offsite support activities), and the receiving stream(s) for the stormwater discharge(s).

**NOTE: A stormwater pollution prevention plan (SWPPP) must be prepared in accordance with the requirements of the General VSMP Permit for Discharges of Stormwater from Construction Activities prior to submitting this Registration Statement. By signing this Registration Statement you are certifying that the SWPPP has been prepared.**

11. **Location Where the SWPPP May be Viewed, and the Name and Phone Number of a Contact Person:** (NOTE: The contact person should be a person knowledgeable in the principles and practice of erosion and sediment controls, that is a licensed professional engineer, Responsible Land Disturber (RLD), or other knowledgeable person that (i) holds a certificate of competence from the board in the area of project inspection; or (ii) is enrolled in the board's training program for project inspection or combined administrator and successfully completes such program within one year of enrollment.)

Location of SWPPP: \_\_\_\_\_

Contact Person Name: \_\_\_\_\_ Phone Number: \_\_\_\_\_

12. **Permanent BMPs:** Attach a list of permanent BMPs (both structural and non-structural) that will be installed at the construction site. For each BMP, include the following information: (a) Type of BMP to be installed; (b) Geographic location (county - State Hydrologic Unit Code); (c) Waterbody the BMP will discharge into; and, (d) Number of acres that will be treated (to the nearest quarter acre).

13. **Certification:** "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment for knowing violations."

Print Name: \_\_\_\_\_ Title: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

(Please sign in INK. The person signing this form must be associated with the operator identified in item #1 above.)

**For Department of Conservation and Recreation Use Only**

Accepted/Not Accepted by: \_\_\_\_\_ Date: \_\_\_\_\_

Basin \_\_\_\_\_ Stream Class \_\_\_\_\_ Section \_\_\_\_\_ Special Standards \_\_\_\_\_



## INSTRUCTIONS for FORM DCR 199-146

## VPDES General Permit Registration Statement - Construction Activity Stormwater Discharges

**General**

A Registration Statement must be submitted when an operator makes application to the Department of Conservation and Recreation for coverage under the General VSMP Permit for Stormwater Discharges From Construction Activities. Mail the completed form to: The Department of Conservation and Recreation, Stormwater Permitting, 203 Governor Street, Suite 206, Richmond, Virginia 23219.

**Section 1 Activity Operator Information**

For the purposes of this general permit, "Operator" means any person, company, corporation, partnership, etc., associated with a construction project that meets either of the following two criteria: (1) has direct operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or (2) has day-to-day operational control of those activities at a project which are necessary to ensure compliance with a stormwater pollution prevention plan for the site or other permit conditions (e.g., they are authorized to direct workers at a site to carry out activities required by the stormwater pollution prevention plan or comply with other permit conditions). The entities who are considered operators will commonly consist of the owner or developer of a project (the party with control of project specifications) and the general contractor (the party with day to day operational control of the activities at the project site which are necessary to ensure compliance with the permit). Contractors and subcontractors who are under the general supervision of the general contractor are not considered operators and would not need to submit a registration statement. Give the legal name of the operator, do not use a colloquial name. Enter the complete address and phone number of the operator. **The permit will be issued to this operator.**

**Section 2 Activity Location Information**

Enter the activity's official name and complete street address, including city, state and ZIP code. If the site lacks a street address, enter the latitude and longitude to the nearest 15 seconds of the approximate center of the site.

**Offsite Support Activities**

The general permit may be used to authorize stormwater discharges from activities that are located away from the construction site (e.g., concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, borrow areas) provided that they meet the following criteria: (1) The support activity is directly related to a construction site that is required to have VSMP permit coverage for discharges of stormwater associated with construction activity; (2) The support activity is not a commercial operation serving multiple unrelated construction projects by different operators, and does not operate beyond the completion of the construction activity at the last construction project it supports; and (3) Appropriate controls and measures are identified in a stormwater pollution prevention plan covering the discharges from the support activity areas.

Provide the information required for each offsite support activity seeking coverage. Support activities located off site are not required to be covered under this general permit. Discharges of stormwater from offsite support activities may be authorized under another VSMP permit. Where stormwater discharges from offsite support activities are not authorized under this general permit, the land area of the offsite support activity need not be included in determining the total land disturbance acreage of the activity seeking general permit coverage.

**Section 3 Legal Status**

Indicate the appropriate legal status of the operator of the site.

**Section 4 Nature of the Construction Project**

Examples: commercial, residential, agricultural, oil and gas, etc.

**Section 5 Name of Receiving Water(s)**

Enter the name of the receiving water(s) for all stormwater discharge(s), including any stormwater discharges from offsite support activities to be covered under the permit.

**Section 6 Name of MS4 Operator**

If the stormwater is discharged through a municipal separate storm sewer system (MS4), enter the name of the operator of the MS4.

**Section 7 Estimated Project Start Date**

Enter the date project is projected to start.

**Estimated Project Completion Date**

Enter the estimated project completion date.

**The Department of Conservation and Recreation reserves the right to request additional information not directly addressed by the Registration Statement if, in its discretion, a facility or operation poses a potential impact on water quality.**

**Section 8 Total Land Area of the Development**

Enter the total area (to the nearest 1/4 acre) of the development (meaning the total acreage of the larger common plan of development or sale). Include the acreage of any offsite support activities to be covered under the permit.

**Estimated Acres to be Disturbed**

Enter an estimate of the total number of acres of the site (to the nearest 1/4 acre) on which soil will be disturbed.

**Section 9 Larger Common Plan of Development or Sale**

Indicate if the area to be disturbed by the construction activity is part of a larger common plan of development or sale.

**Section 10 Map**

Attach a topographic map or other map which clearly shows the location of the construction activity, the area to be disturbed, and the receiving stream(s) for the stormwater discharge(s), including any offsite support activities to be covered under the permit.

**Section 11 Location of Pollution Prevention Plan (SWPPP)**

A stormwater pollution prevention plan (SWPPP) must be prepared in accordance with the requirements of the General VSMP Permit for Discharges of Stormwater from Construction Activities prior to submitting this Registration Statement. Give the location where the stormwater pollution prevention plan for the site may be viewed, and the name and phone number of a contact person. The contact person should be a person knowledgeable in the principles and practice of erosion and sediment controls, that is a licensed professional engineer, Responsible Land Disturber (RLD), or other knowledgeable person that (i) holds a certificate of competence from the board in the area of project inspection; or (ii) is enrolled in the board's training program for project inspection or combined administrator and successfully completes such program within one year of enrollment.

**Section 12 Permanent BMPs That Will Be Installed**

Attach a list of the permanent BMPs (both structural and non-structural) that will be installed at the construction site. For each BMP, include the following information:

- (a) Type of BMP to be installed
- (b) Geographic location ( county - State Hydrologic Unit Code)
- (c) Waterbody the BMP will discharge into
- (d) Number of acres that will be treated (to the nearest quarter acre)

**Section 13 Certification**

**The operator identified in Section 1 of this Registration Statement is responsible for certifying and submitting this Registration Statement. Please sign the form in INK. State statutes provide for severe penalties for submitting false information on this Registration Statement. State regulations require this Registration Statement to be signed as follows:**

For a corporation: by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means: (1) A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (2) the manager of one or more manufacturing, production, or operating facilities provided the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures; **[Note: if the title of the individual signing this form is "Plant Manager", submit a written verification that the authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures];**

For a partnership or sole proprietorship: by a general partner or the proprietor, or

For a municipality, state, Federal, or other public facility: by either a principal executive officer or ranking elected official.



**DEPARTMENT OF CONSERVATION AND RECREATION PERMIT APPLICATION FEE  
FORM  
EFFECTIVE SEPTEMBER 2004**

**INSTRUCTIONS**

Applicants for an individual Virginia Stormwater Management Program (VSMP) Permit is required to pay permit application fees. Fees are also required for registration for coverage under General Permits. Fees must be paid when applications for permit issuance or modification are submitted. Applications will be considered incomplete if the proper fee is not paid and will not be processed until the fee is received.

The permit fee schedule is included with this form. Fees for permit issuance or reissuance and for permit modification are included. Once you have determined the fee for the type of application you are submitting, complete this form. The original copy of the form and your check or money order payable to "Treasurer of Virginia" should be mailed to:

Virginia Department of Conservation and Recreation  
Division of Finance, Accounts Payable  
203 Governor Street, 4<sup>th</sup> Floor  
Richmond, Virginia 23219

A copy of the form and a copy of your check or money order should accompany the permit application. You should retain a copy for your records. Please direct any questions regarding this form or fee payment to the Urban Programs Section of the Department of Conservation and Recreation at (804) 786-3998.

APPLICANT NAME: \_\_\_\_\_ SSN/FIN: \_\_\_\_\_

ADDRESS: \_\_\_\_\_  
\_\_\_\_\_

DAYTIME PHONE: (\_\_\_\_) \_\_\_\_ - \_\_\_\_\_

FACILITY/ACTIVITY NAME: \_\_\_\_\_

LOCATION: \_\_\_\_\_

TYPE OF PERMIT APPLIED FOR

(from Fee Schedule): \_\_\_\_\_

TYPE OF ACTION: \_\_\_\_\_ New Issuance \_\_\_\_\_ Reissuance \_\_\_\_\_ Modification

AMOUNT OF FEE SUBMITTED

(from Fee Schedule): \_\_\_\_\_

EXISTING PERMIT NUMBER (if applicable): \_\_\_\_\_

**FOR DCR USE ONLY**

Date: \_\_\_\_\_ DC #: \_\_\_\_\_



## FEE SCHEDULES

**A. VSMP Permits.** Applications for issuance of new individual VSMP permits, and for permittee initiated major modifications that occur (and become effective) before the stated permit expiration date. [NOTE: Individual VSMP permittees pay an Annual Permit Maintenance Fee instead of a reapplication fee. The permittee is billed separately by DCR for the Annual Permit Maintenance Fee.]

TYPE OF PERMIT	ISSUANCE	MODIFICATION
VSMP Municipal Stormwater / MS4 Individual (Large and Medium)	\$21,300	\$10,650
VSMP Municipal Stormwater / MS4 Individual (Small)	\$2,000	\$1,000

**B. Registration Statements for VSMP General Permit Coverage.** The fee for filing a permit application (registration statement) for coverage under a VSMP stormwater general permit issued by the permit issuing authority is as follows:

TYPE OF PERMIT	ISSUANCE
VSMP Municipal Stormwater / MS4 General Permit (Small)	\$600
VSMP General / Stormwater Management - Phase I Land Clearing ("Large" Construction Activity - Sites or common plans of development equal to or greater than 5 acres)	\$500
VSMP General / Stormwater Management - Phase II Land Clearing ("Small" Construction Activity - Sites or common plans of development equal to or greater than 1 acre and less than 5 Acres)	\$300

**C. Permit Maintenance Fees.** The annual permit maintenance fees apply to each VSMP permit identified below, including expired permits that have been administratively continued.

TYPE OF PERMIT	MAINTENANCE
VSMP Municipal Stormwater / MS4 Individual (Large and Medium)	\$3,800
VSMP Municipal Stormwater / MS4 Individual (Small)	\$400
VSMP General / Stormwater Management - Phase I Land Clearing ("Large" Construction Activity - Sites or common plans of development equal to or greater than 5 acres)	\$0
VSMP General / Stormwater Management - Phase II Land Clearing ("Small" Construction Activity - Sites or common plans of development equal to or greater than 1 acre and less than 5 Acres)	\$0

**LIST OF LOCAL RECYCLING COMPANIES**  
**Updated List as of 02/26/09**

Ace Recycling  
1301 North Enon Church Road  
Chester VA 23836  
(804) 318-3701

Antique Building Products  
P.O. Box 206  
Amherst, VA 24521  
(804) 946-0634

Atlantic Iron & Metal  
30 Mill Street  
Petersburg, VA 23803  
(804) 861-1900  
and  
Richmond, VA 23224  
(804) 232-4175  
[www.caravatis.com](http://www.caravatis.com)

CMC  
4509 Pouncey Tract Road  
Glen Allen, VA 23059  
(804) 369-2120

S.B. Cox, Inc  
901 Potomic Street  
Richmond, VA 23231  
(804) 222-2232

Dominion Salvage  
607 Dinwiddie Avenue  
Richmond, VA  
(804) 231-7964

Dwight Snead Construction  
11255 Washington Highway  
Glen Allen, VA 23059  
(804) 798-1611

Heartwood International  
141 Heartwood Circle  
Afton, VA 22920  
(804) 361-1873

Mark Dunning Industries  
1774 Fine Street  
Prince George, VA 23875  
(804) 732-4444

Mountain Lumber  
P.O. Box 289  
Ruckersville, VA 22968  
(804) 445-2671  
[www.mountainlumber.com](http://www.mountainlumber.com)

N&W Salvage, Inc.  
541 Trampton Road  
Sandston, VA 23150  
(804) 328-3440  
and  
319 West Williamsburg Road  
Sandston, VA 23150  
(804) 737-0279

Salvage Barn  
5240 Hull Street Rd  
Richmond, VA 23224  
(804) 231-1187

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EP 310-1-6a  
01 Jun 06

Construction Project Identification Sign

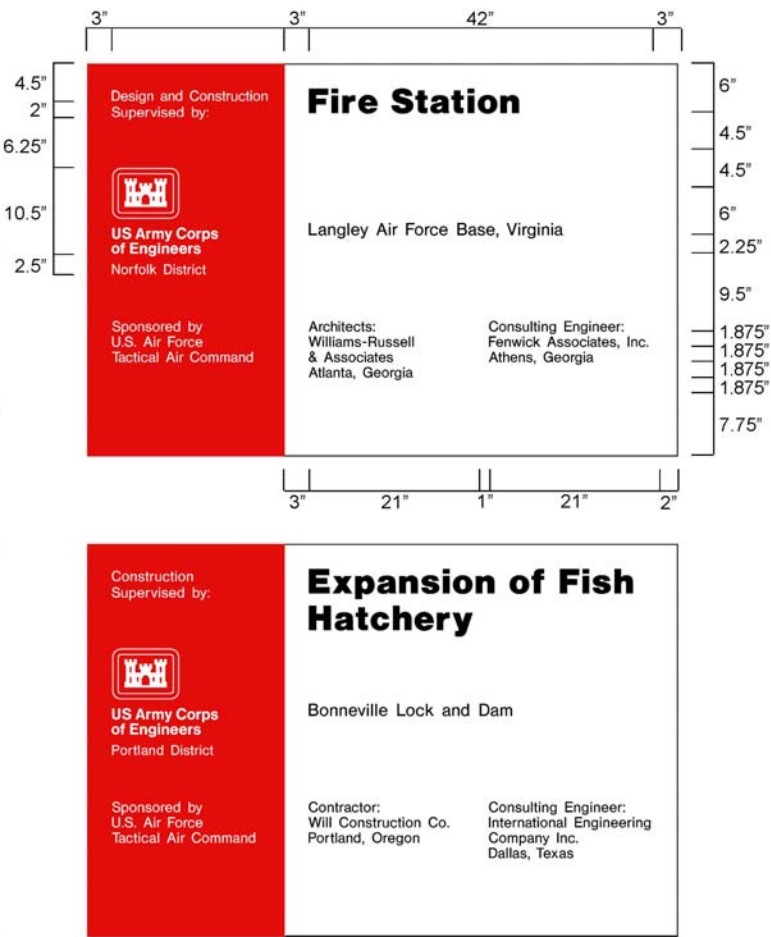
Below are two samples of the Construction Project Identification sign showing how this panel is adaptable for use to identify either military (top) or civil works projects (bottom). The graphic format for this 4'x 6' sign panel follows the legend guidelines and layout as specified below. The large 4'x 4' section of the panel on the right is to be white with black legend. The 2'x 4' section of the sign on the left

with the full Corps Signature (reverse version) is to be screen-printed Communication Red on the white background. The designation of a sponsor in the area indicated is optional with Military or Civil Works construction signs. Signs may list one sponsoring entity. If agreement on a sponsor designation cannot be achieved, the area should be left blank.

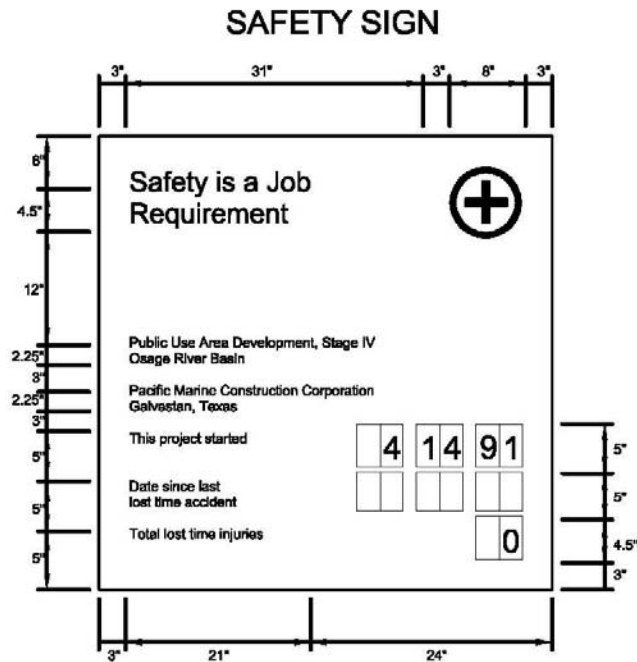
This sign is to be placed with the Safety Performance sign shown on the following page. Mounting and fabrication details are provided on page 16-4.

Special applications or situations not covered in these guidelines should be referred to the district Sign Program Manager.

- Legend Group 1: One- to two-line description of Corps relationship to project.  
Color: White  
Typeface: 1.25" Helvetica Regular  
Maximum line length: 19"
- Legend Group 2: Division or District Name (optional). Placed below 10.5" reverse Signature (6" Castle).  
Color: White  
Typeface: 1.25" Helvetica Regular
- Legend Group 2a: One- to three-line identification of Military or Civil Works sponsor (optional). Place below Corps Signature to cross-align with Group 5a-b.  
Color: White  
Typeface: 1.25" Helvetica Regular  
Maximum line length: 19"
- Legend Group 3: One- to three-line project title legend describes the work being done under this contract.  
Color: Black  
Typeface: 3" Helvetica Bold  
Maximum line length: 42"
- Legend Group 4: One- to two-line identification of project or facility (civil works) or name of sponsoring department (military).  
Color: Black  
Typeface: 1.5" Helvetica Regular  
Maximum line length: 42"
- Cross-align the first line of Legend Group 4 with the first line of the Corps Signature (US Army Corps) as shown.
- Legend Groups 5a-b: One- to five-line identification of prime contractors including: type (architect, general contractor, etc.), corporate or firm name, city, state. Use of Legend Group 5 is optional.  
Color: Black  
Typeface: 1.25" Helvetica Regular  
Maximum line length: 21"
- All typography is flush left and rag right, upper and lower case with initial capitals only as shown. Letter- and word-spacing to follow Corps standards as specified in Appendix D.



Sign Type	Legend Size (A)	Panel Size	Post Size	Specification Code	Mounting Height	Color Bkg/Lgd
CID-01	various	4'x6'	4"x4"	HDO-3	48"	WH-RD/BK



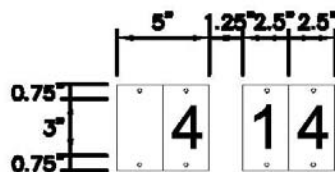
All typography is flush left and rag right, upper and lower case with initial capitals only as shown. Letter and word spacing to follow Corps Standards (EP 310-1-6a and 6b).

Legend Group 1: Standard two-line title "Safety is a Job Requirement" with (8" od.) Safety Green First Aid logo. Typeface: 3" Helvetica Bold; Color: Black.

Legend Group 2: One to two-line project title legend describes the work being done under this contract and name of host project. Typeface: 1.5" Helvetica Regular; Color: Black; Maximum line length: 42".

Legend Group 3: One to two-line Identification: name of prime contractor and city, state address. Typeface: 1.5" Helvetica Regular; Color: Black; Maximum line length: 42".

Legend Group 4: Standard safety record captions as shown. Typeface 1.25" Helvetica Regular; Color: Black.



Replaceable numbers are to be mounted on white 0.060 aluminum plates and screw-mounted to backdrop. Typeface: 3" Helvetica Regular; Color: Black; Plate size: 2.5"x 4.5".



Technical drawing of a retaining wall cross-section. The wall is 10'-0" high and 10'-0" wide at the base. The top is labeled "Vertex". The wall is constructed from TREATED 4x4 POSTS. The wall face is covered with 3/4" EXTERIOR PLYWOOD. A TREATED 2x6 BRACE BETWEEN POSTS is shown. A 14'-0" TREATED 2x4 BRACE FOR EACH POST is shown. TREATED 2x4 STAKES are shown. The wall is founded on a 15° slope. The drawing includes dimensions for the wall height (10'-0"), width (10'-0"), and the angle of the foundation (15°). Labels include: Vertex, TREATED 2x6, TREATED 2x6 BRACE BETWEEN POSTS, 3/4" EXTERIOR PLYWOOD, 14'-0" TREATED 2x4 BRACE FOR EACH POST, TREATED 2x4 STAKES, TREATED 2x4 BRACE BETWEEN POSTS, TREATED 4x4 POSTS, and 15°.



### **Dominion Virginia Power – Fort Lee Project Requirements**

The following information, in its entirety, is required prior to Dominion Virginia Power proceeding with any engineering/design of our electrical distribution facilities and/or lighting, required to support service to your Fort Lee project. The term “Contractor” will refer to the Building/Primary Contractor or others.

1. 100% final design drawings in both **AutoCAD 2006LT** and **PDF** electronic file formats and ½-size hardcopy.
  - a. Site civil and utilities demo drawings. (These are typically stand-alone drawings from the other information referenced in this document.)
  - b. New construction site plan, civil and utilities drawings (including final grade elevations)
  - c. A drawing of the mechanical/electrical room layout and location in building; with electrical delivery point identified
  - d. Electrical one line drawing for the main electrical switchgear/service equipment.
  - e. Area, sidewalk, parking or streetlights that are not served from a power source inside a building will belong to Dominion Virginia Power. For these applications, the Contractor will provide the lighting design/layout. Dominion’s and Fort Lee’s standard light and pole configuration utilizes the Cooper Tribute Luminaire in 150W and 250W HPS mounted on either a 15’, 30’ or 35’ pole. Other Dominion standard utility type lighting options are available and can be provided, by request, for special applications. Contractor will provide staking of the pole locations and a final grade elevation mark.
2. A completely executed Dominion Virginia Power Load Letter must be submitted, for equipment and service sizing. The address line for the load letter **MUST** include the Fort Lee permanently assigned building number (not construction building number). The load letter can be downloaded from [www.dom.com](http://www.dom.com) (type load letter in the search box.)
3. Secondary conduits, both inside and extending approximately 8’ outside the building are to be supplied and installed by the Contractor. Dominion will provided, **in writing**, the number, size and specifications for this conduit. No conduit should be installed until receiving this notification.
4. External conduits from the building going to, and into, the transformer pad well, will be specified and installed by Dominion unless other arrangements are made, during our project design or project construction sequence. These facilities will be provided under the conditions of Dominion’s “Five Foot Rule” or “Exception to the Five Foot Rule” as found in our 2007 Requirements for Electric Service (Blue Book). The Blue Book can be downloaded from our web site at [www.dom.com](http://www.dom.com) (type “Blue Book” in the search box.) Configurations outside these rules will require coordination of ownership and installation by others.



5. The secondary cable size, type and quantities will be specified and installed by Dominion in accordance with our Blue Book "Five Foot Rule", "Exception to the Five Foot Rule" or other applicable sections. Configurations outside these rules will require coordination of ownership and installation by others.
6. Electrical switchgear CT and secondary cable compartments **must be approved in writing**, by Dominion, prior to being ordered by the Contractor.
7. Dominion's meter equipment (CT cabinet, meter trim and CT's) will be provided to the Contractor for installation in accordance with Dominion's Blue Book
8. The aforementioned Dominion "Blue Book" will provide additional information regarding our requirements and connection for electric service.